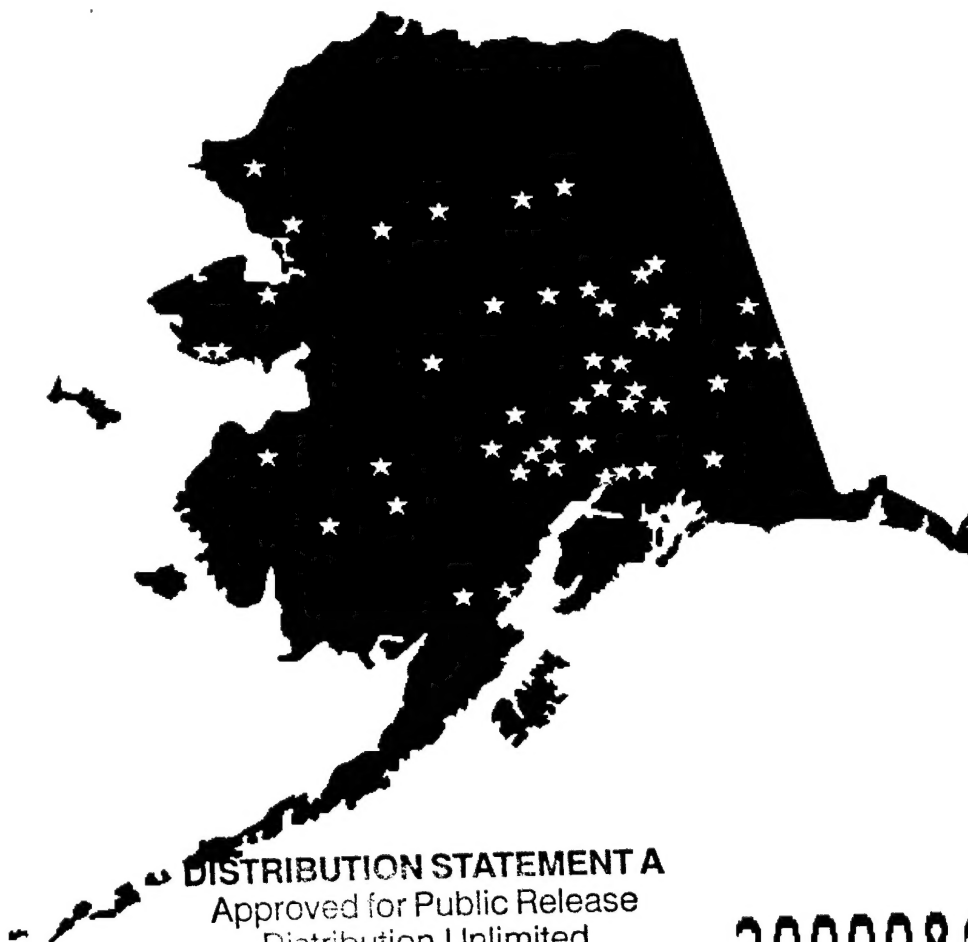


## **DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS**

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## **AIRBORNE GEOPHYSICAL/GEOLOGICAL MINERAL INVENTORY CIP PROGRAM**

**DMS QUALITY INSPECTED**

AGI00-11-3411

## BACKGROUND

The Airborne-Geophysical/Geological Mineral Inventory project is a special multi-year investment to expand the knowledge base of Alaska's mineral resources and catalyze private-sector mineral development. The project seeks to delineate mineral zones on Alaska state lands that: 1) have major economic value; 2) can be developed in the short term to provide high quality jobs for Alaska; and 3) will provide economic diversification to help offset the loss of Prudhoe Bay oil revenue. Started in 1992, the project was originally designed to systematically acquire geophysical, and where necessary, geological data for about 40 million acres of state-owned uplands having high perceived mineral potential. Funding restrictions have led to decreasing the annual scope of the project, but the purpose and goals have not changed.

Public release of the geophysical and geological data collected from these surveys

has had a rapid and profoundly positive effect on private-sector exploration investments in the Nome, Circle, and Fairbanks areas. Millions of dollars of venture capital have been spent in the local economies of these districts in direct response to the new geologic knowledge provided by the surveys. This rate of investment will continue for years. We anticipate exploration activities in the Rampart, Manley, Tofty, Upper Chulitna, Petersburg, and Ruby districts also will accelerate as

the recently completed geophysical surveys and the geological data needed to interpret them become available.

Although mineral development is a high risk enterprise, there is a good probability that several of the prospects identified with the help of data generated by this project will become major mines and thus return the amount of

the state's data generation investment a hundred fold. Clearly, the Airborne Geophysical/ Geological Mineral Inventory project has been successful in catalyzing private-sector investment and job generation at a level that far surpasses the cost of conducting the surveys. A similar investment in geologic knowledge in 1982 contributed to the ultimate development of the Fort Knox gold mine that is currently adding several hundred million dollars of capital to the state's economic base and is projected to contribute about \$76 million per year to Alaska's economy for at least the next 12 years.

This project was initiated in FY93 with a legislative CIP ap-

propriation of \$450,000. That amount was insufficient to acquire the quality and amount of airborne geophysical and geological data needed for the start of an effective cost efficient program. Thus additional funding was requested of the Legislature in FY94. By June of 1993, the Legislature had appropriated an additional \$750,000, which was pooled with the previous year's appropriation to launch the project. The first mineral districts surveyed were Nome-west, Nyac, Circle-core,



and Valdez Creek. Geophysical maps and computer-compatible data files for these districts were available to the public by February 1994. In FY95, airborne geophysical surveys were completed for the core areas of the Fairbanks and Richardson mining districts. In FY96, major portions of the Rampart-Manley-Tofty mining districts were flown. The FY97 legislative CIP appropriation funded an airborne survey of the remaining high mineral potential area of the Rampart district and also geophysical surveys of the Upper Chulitna and Petersville-Collinsville mining districts. In FY98, DGGS contracted for airborne geophysical surveys of the Ruby district south of the Yukon River, and the Iron Creek district north of Wasilla. To date, 3,154,200 acres have been geophysically surveyed (Table 1) and \$3,070,000 of CIP funds have been appropriated to fund the project.

Candidate lands for this project have been identified on the basis of existing geologic knowledge, land ownership, and responses to solicitations for nominations from Alaska's mineral industry and Native regional corporations. Currently 51 mineral districts have been identified as candidates for the airborne-geophysical/geological mineral inventory surveys (fig. 1).

As of September 1997, field work has been completed for the 11 geophysical and geological surveys noted below in Table 1.

Three surveys (western Nome District, Nyac, and parts of the Rampart/Manley District) were conducted in cooperation with the Bering Straits Native Corporation, Sitnasuak Village Corporation, Calista Native Corporation and Doyon Native Corporation, respectively. As owners of large tracts of land intermingled with state lands, they contributed various combinations of services, private geoscience data files, and funding to support the surveys.

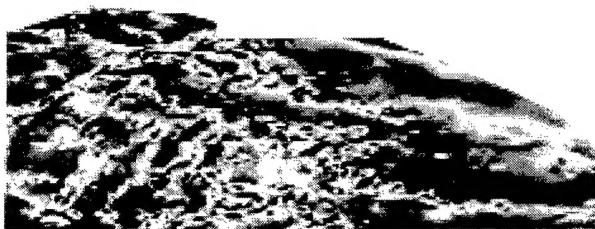
Numerous major mining companies have been active in the Nome, Circle, Upper Chulitna, and Fairbanks areas following release of the geophysical surveys. Several million dollars were spent in exploration, and approximately 150 new claims were located on State lands in the Nome area following the geophysical and geological surveys of the western half of the Nome district. The renewed corporate interest and prospect identification in the Nome area continues to this day and additional geophysical and geological surveys of the eastern half of the district would further increase

*Table 1. Geophysical survey areas for which data gathering and field work is complete.*

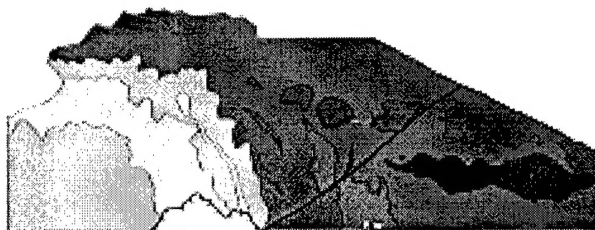
Nome District western core area	494 sq. miles	Airborne geophysical/ground-truth geological mapping
Nyac District core area	183 sq. miles	Airborne aeromagnetic mapping only
Circle District core area	338 sq. miles	Airborne geophysical mapping/ground-truth geological mapping
Valdez Creek District	75 sq. miles	Airborne geophysical mapping
Fairbanks District	626 sq. miles	Airborne geophysical mapping/ground-truth geologic map
Richardson District	137 sq. miles	Airborne geophysical mapping/ground-truth geologic map (ground-truth pending)
Rampart/Manley-Tofty	1017 sq. miles	Airborne geophysical mapping/ground-truth geologic map (complete in FY99)
Upper Chulitna District	364 sq. miles	Airborne geophysical mapping/ground-truth geologic map (ground-truth in progress)
Petersville-Collinsville District	415 sq. miles	Airborne geophysical mapping/ground-truth geologic map (ground-truth in FY99)
Iron Creek District	689 sq. miles	Airborne geophysical mapping/ground-truth geologic map (ground-truth pending)
Ruby District	591 sq. miles	Airborne geophysical mapping/ground-truth geologic map (ground-truth in progress)

the probability of establishing a major mine. Likewise, the Circle district has received new attention from major mining companies. Immediately following the release of the Fairbanks district airborne geophysical maps, over 100 square miles of mineral claims were staked and subsequent exploration activity has been intense. Progress has been made in locating a second major lode gold deposit, and continued exploration involving a growing number of major mining companies proceeds unabated. Many of the immediate exploration expenditures are made locally, and if mineral production results, scores of additional high quality jobs will be created for local residents.

The Geophysical/Geological Mineral Inventory CIP project is designed to coordinate the generation of air-

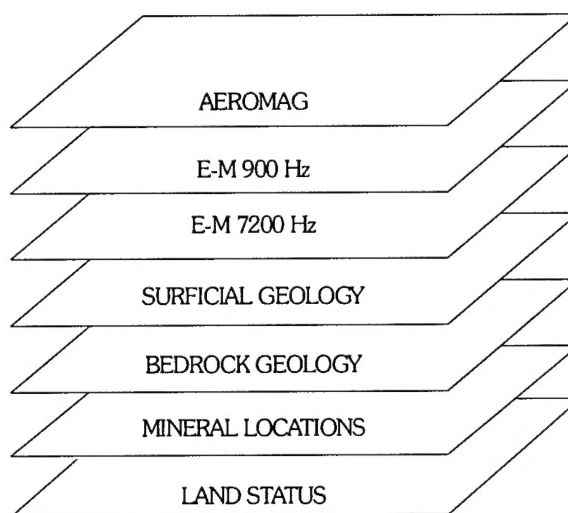


borne geophysical data with ground-based geologic surveys. The geophysical data are of limited effectiveness unless good geologic maps are available to permit analysis and interpretation of the geophysics. If existing geologic data are inadequate, the required geologi-



cal surveys are most effective when they follow generation of the final geophysical maps. Thus, unless good quality 1:63,360-scale geologic maps already exist, at least one additional year of ground-based field studies is needed to complete a project after an area has been surveyed with airborne geophysical sensors.

Post-geophysical survey ground-truth mapping is now being conducted in the Manley-Tofty tract flown in FY96 and FY97. Results of geological work done in the summer of 1997 will be released in the spring of 1998. Ground-truth geologic mapping in the Rampart-Manley-Tofty districts was planned for completion in



two field seasons. FY98 is the second and final year of this effort. A two-year ground-truth geological survey of the Upper Chulitna mineral district began in July 1997 (FY98) and is scheduled for completion in FY99. In FY99, DGGS will begin a two-year ground-truth geological inventory of the Petersville airborne geophysical survey tract. We will begin ground-truth work in the Iron Creek survey tract in FY00. Previously authorized CIP funds are designated to support these geological ground truth activities. Unless additional funds are appropriated to initiate new airborne-geophysical/geological mineral surveys elsewhere, no new high mineral potential tracts will be geophysically surveyed in FY99.

For FY99, DGGS has identified four possible survey tracts that have good potential for the discovery and near-term development of a major mineral deposit. Contingent upon funding available we will initiate an airborne geophysical/geological ground-truth mineral survey on one or more of these four tracts. Cost of the surveys varies depending on each tract's size, location, and bid responses from geophysical services vendors. In the past, geophysical/geological surveys of single minimal but reasonably sized tracts have required about \$400,000 in CIP funds, augmented by Federal Receipts and General Funds from the operating budget.

#### WHY IS THE PROJECT NEEDED?

Geologic resources comprise a major part of Alaska's economic assets. The location and magnitude of these resources are largely unknown, yet that knowledge is



the key to orderly development of the state and to the maintenance of a stable economy. Experienced mineral exploration managers have characterized Alaska's present state of mineral development as analogous to that of the entire group of states west of the Rocky Mountains in the late 1800s. At that time a few major ore bodies had been found and prospectors had located hundreds of prospects but none of the scores of subsequent world-class mines had been discovered. Alaska is like that. We, however, have the opportunity, capital, and technology to expedite discovery if we so choose.

Alaskans cannot manage or develop assets that are unknown and unquantified. The present lack of geologic knowledge is a formidable impediment to long-range planning for both industry and the state. The lack of knowledge discourages private-sector investment in Alaska, and instead favors capital allocation to other areas of the world where comprehensive assessments exist or are being actively generated. Major mining companies rely on government-supplied exploration scale (1:63,360) geological, geophysical, and geochemical maps to design and implement their programs. They expect at least this level of effort from any government that seriously desires a mineral industry. Alaska is in competition with every other country, state, and province for investment dollars. Many of those competitors' lands have far less potential than Alaska, are just as remote, have been more explored, or exist in a much less stable political climate than Alaska but they are more successful than Alaska in sustaining a robust mining industry because of their extensive geologic information base or because of the pace at which they are generating such a base of new information.

Applications of a thorough resource information base include:

1. **Enhancing community and local government economies and revenue opportunities.** Resource development in these areas can provide local sources of wages, tax revenue, and royalty income that are necessary for local infrastructure and essential services.
2. **Stimulating private-sector exploration and competitive development of Alaska's mineral resources.** The present lack of geologic resource knowledge is a formidable impediment to long-range planning for both industry and the state. The lack of resource knowledge discourages private-sector
- investment in Alaska, and instead favors capital allocation to other areas of the world where comprehensive assessments exist.
3. **Marine terminal and transportation corridor development.** Transportation infrastructure development always requires cost justification based on prior knowledge of resource availability indicating the likelihood of investment payback and geotechnical knowledge that ensures engineering feasibility.
4. **Long-term decisions on management of state-interest lands.** Products from this project allow the state to look beyond the short-term rise and fall of commodity markets in formulating mineral-resource policies and in responding to related issues, such as land trades, corridor development, area plans, etc.

## GOVERNOR'S AWARENESS

The Governor has expressed strong support for this program in several forums including speeches before the Alaska Miners Association and other key business groups.

## PROJECT SUPPORT

Local communities, Native corporations, private resource industry, Alaska Minerals Commission, regional borough governments, Department of Commerce and Regional Affairs, Department of Natural Resources. Following are some of the comments we have received regarding this project.

*"Even though we are not providing an opinion right now, I wanted to thank you for the opportunity to comment on potential geophysical/geological survey work within the state. The benefit of such surveys has been clearly demonstrated in the Fairbanks district. We support the work of you and your colleagues at DGGS and look forward to the results of additional work."*

—Gary Coulter, Senior Mine Geologist  
Cominco Alaska Incorporated

*"Thank you for the opportunity to comment on areas to be flown by the Survey and for your serious consideration of these requests. Also, compliments to everyone at DNR and DGGS for the excellent*

*products generated by the Geophysics Program."*

—Jeff Foley, Senior Exploration Geologist  
Calista Corporation

*"I would encourage those of you who can influence state budgets to continue to fund this effort (airborne geophysical mapping). While many larger companies can afford to gather this data themselves, the smaller companies cannot. And it is more often than not the grass-roots exploration efforts of the smaller operator that leads to significant discoveries that ultimately benefit the state greatly."*

—Klaus M. Zeitler  
Senior Vice President of  
Development and Exploration  
Teck Corporation

*"Surveys provided by the DGGS program could yield more detailed information about geologic and mineral trends that would be useful for mineral developers. The information about the Yenlo Hills region's potential would also be useful to the Borough as we attempt to encourage the mining industry to locate and expand operations. The Matanuska-Susitna Borough is seeking to diversify the economic opportunities for local residents and exploration of the potential mineral deposits in the Yenlo Hills region would assist in this endeavor."*

—Donald L. Moore, Borough Manager  
Matanuska-Susitna Borough

*"I and my clients look forward to receiving additional high quality information on Alaska mining districts and I would like to take the opportunity to commend you and your staff for the superb geophysical and geological products which your efforts have generated in the past."*

—Curtis J. Freeman, President  
Avalon Development Corporation

*"I appreciate having this opportunity to suggest areas for your consideration. The airborne program is meeting excellent reception in the minerals industry, and I encourage you to continue your efforts."*

—Harold J. Noyes  
Manager, Resource Development  
Doyon, Limited

*"I would also like to take this opportunity to express our support for the state's airborne geophysical program. We have found the data extremely useful in our exploration effort and feel that the program represents a very efficient, and useful, expenditure of state funds."*

—James Fuego, Project Geophysicist  
Kennecott Exploration Company

## PUBLIC BENEFITS

The public at large benefits both in the short and long term through local employment opportunities created in the private sector and better resource management decisions regarding issues such as land trades, classifications, etc. The public especially benefits from a diversification of Alaska's economy and the enlargement of the state's long-term quality job base.

## ALTERNATIVE APPROACHES CONSIDERED

1. Sole reliance on satellite or remote sensing imagery. This approach is rejected because of low resolution and because it cannot look beneath extensive ground cover such as tundra, forest, and soil types in Alaska, and also because it does not provide an unambiguous methodology for detecting subsurface mineralization.
2. Sole reliance on currently available data. Rejected because of general lack and quality of geologic data. Only seven percent of Alaska has adequate geological mapping, and almost none of it has detailed geophysical surveys.
3. Sole reliance on ground-based field investigations. Rejected because of protracted time necessary for such an approach (decades) and because it provides no subsurface information.
4. Sole reliance on airborne geophysical methods. Rejected because geophysical anomalies alone

cannot be interpreted without geological and geochemical control.

5. An integrated approach, utilizing regional geophysical and geochemical methods which define resource-rich regions, followed by detailed airborne geophysical surveys and ground-based geological/geochemical investigations of high priority areas. This approach allows the inventory to be completed in an acceptable time, to discriminate between barren and resource-rich anomalies, to identify specific commodities, and provide a quantified estimate of resource value and location.

## **SUPPORT TO THE OPERATING BUDGET**

This project complements the DGGs operating/policy budget. Most of the core geological activities, contract management, and support functions are carried out by existing staff and are partially funded by the base operating budget. Geophysical investigations will be done mainly through private-sector contracts funded by this CIP project.

## **DESCRIPTION OF WORK TO BE DONE IN FY99**

Contingent upon funding, in FY99 DGGs proposes to conduct airborne geophysical surveys in one or more areas in interior Alaska, east-central Alaska, northwestern Alaska, or southwestern Alaska. During the course of the airborne-geophysical/geological mineral inventory project, 51 candidate areas have been nominated by Alaskans for mineral surveys. To date the highest mineral potential tracts within 11 of these nominated mining districts have been subjected to airborne geophysical surveys. Following is a more detailed description of the work being proposed for FY98.

### **Area 1: Livengood District, Central Alaska**

The Livengood district is located about 60 miles north of Fairbanks, Alaska. Road access is provided by the Elliott Highway and numerous local mine roads. The district is in the northwest part of the Yukon-Tanana upland. Bedrock in the area consists of various deformed chert units, shales, dolomites, argillites and sand-

stones in fault or unconformable contact with a thick sequence of flysch to the north. Highly altered, probably Devonian, basalt is spatially associated with low angle thrust faulting on the north flank of Money Knob south of Livengood townsite. Minor diorite, gabbro, greenstone, and serpentine crop out on the south flank of Amy Dome. Late Cretaceous to earliest Tertiary intermediate to felsic igneous rocks intrude the sedimentary rock sequence. Numerous felsic dikes and sills have been mapped in the central part of the Livengood district on Money Knob and have a spatial association with the presumed source area for most of the district's placer gold.

Radiometric age dates of the felsic intrusive rocks range from 58.0-88.8 million years old. The contacts between igneous and sedimentary rocks are often sheared and hydrothermally altered. There is a thermally baked hornfels zone in the sedimentary rocks surrounding some of the intrusions.

The Livengood district has produced over 496,000 ozs of placer gold. Lode prospects having gold mercury or antimony mineralization are concentrated on the west end of the ridge south of Livengood known as Money Knob. Ruth, Lillian, and Olive Creeks drain the west end of the ridge. All three creeks hosted placer gold deposits. South of Money Knob, anomalous concentrations of base metals have been noted in the stream sediments of Rainey Hollow.

Like most of interior Alaska, the Livengood district has relatively sparse outcrop because of extensive vegetative cover. Airborne geophysical surveys would provide valuable information to help decipher the distribution of the intrusive rocks and fault structures believed to control the occurrence of mineralization. Any new development would benefit from the good access provided by the Elliott Highway.

Products resulting from these surveys would include:

1. 1:63,360-scale aeromagnetic and airborne-electromagnetic maps
2. 1:63,360-scale bedrock and surficial geologic maps
3. 1:63,360-scale mineral occurrence maps
4. 1:63,360-scale land status map
5. Various other geological, geochemical, and geophysical data compilations

## Area 2: Fortymile District, Eastern Alaska

The Fortymile district comprises the oldest placer gold camp in Alaska. The area of interest is drained by the Fortymile River system that flows west into the Yukon River. As a whole, the district contains a mixture of state, Native Corporation, and federal lands. The Taylor highway connecting Eagle to the Alaska Highway on the south provides road access through the eastern and central third of the district. Alluvial gold as first discovered in the Fortymile district in 1886. to date, more than 500,000 ounces of placer gold have been produced from the district. Like much of the Yukon-Tanana Uplands, the district is underlain by rocks more than 250 million years old that have been deformed and regionally metamorphosed by great heat and pressure. Prior to metamorphism, the bedrock was a sequence of sedimentary sandstones, shales and limestones with lesser amounts of volcanic rocks. These have been transformed into a series of schists, gneisses, marbles, and greenstones. Younger igneous rocks of mafic, intermediate, and granitic composition subsequently intruded the metamorphosed rocks. Large low-grade copper-molybdenite porphyry deposits are known to occur in the southern part of the district. One gold lode prospect (Purdy) exhibited visible gold in a quartz-carbonate vein. No large-scale sources for the district's considerable placer gold have been verified. Weak lead, zinc, and silver stream sediment anomalies have been identified on tributaries to the Fortymile River.

A major problem impeding mineral exploration in this country is the extensive thick vegetation cover that results in very limited rock exposure. Airborne geophysics would provide a valuable tool for projecting geologic units between sparse outcrops and for identifying anomalous geologic conditions beneath the cover that might be associated with lode mineralization.

Products resulting from these surveys would include:

1. 1:63,360-scale aeromagnetic and airborne-electromagnetic maps
2. 1:63,360-scale bedrock and surficial geologic maps
3. 1:63,360-scale mineral occurrence maps
4. 1:63,360-scale land status map
5. Various other geological, geochemical, and geophysical data compilations

## Area 3: Northern Solomon District, Seward Peninsula

In 1993, DGGs conducted airborne-geophysical and ground-truth geological mineral surveys in the western half of the Nome mining district. The entire eastern half of the district also has high mineral potential but has not been geophysically or geologically inventoried. Our long-term objective is to acquire airborne geophysical and ground-truth geological data for the entire eastern Nome mining district. Because funding is often limited, however, we have subdivided the eastern Nome district into four potential survey tracts: northern Solomon, southern Solomon, Bluff, and Council.

The eastern Nome district encompasses the smaller Solomon, Bluff, and Council districts which have collectively produced 5,921,000 ounces of gold (18 percent of total historical Alaskan output) from 1898-1995. The region is drained by Iron Creek, tributary to the Pilgrim and Kuzitrin Rivers. The proposed tracts contain a mixture of Native, state, and federal lands. The eastern Nome district is underlain by metamorphic rocks of the Nome Group which have been subdivided by DGGs and industry geologists during recent past geological and mineral surveys in the western Nome district. The Nome Group rocks contain several important mineral deposit types including low-sulfide gold quartz veins and zinc-silver-lead-gold massive sulfide deposits. Heavy mineral gold placer deposits have accounted for nearly all the past gold production. A combined airborne geophysical and geological ground-truth survey will allow industry to conduct more efficient detailed mineral exploration in the Nome area. If successful in catalyzing the development of a major year-round mining operation, the Alaska citizens living on the Seward Peninsula will have a significantly expanded opportunity for local employment.

Products resulting from these surveys would include:

1. 1:63,360-scale aeromagnetic and airborne-electromagnetic maps
2. 1:63,360-scale bedrock and surficial geologic maps
3. 1:63,360-scale mineral occurrence maps
4. 1:63,360-scale land status map
5. Various other geological, geochemical, and geophysical data compilations

#### Area 4: Iditarod mining district, southwestern Alaska

Located in southwestern Alaska and accessible via the Kuskokwim River, the Iditarod-Flat (Flat) and Iditarod-Donlin (Donlin) districts have produced approximately 1,490,000 ounces of gold worth \$558 million, about 46 percent of all the gold mined from the greater Kuskokwim Mineral Belt, of which the Iditarod district is a part. Both the Flat and Donlin districts contain unique types of mineralization. Acquiring airborne-geophysical signatures for the type of mineralization found in both districts, along with geophysical data for the greater Kuskokwim Mineral Belt as a whole would be a significant aid in advancing successful mineral exploration and development in this part of rural Alaska.

The principal mineral deposits consist of: (1) copper-gold stockwork in 70-million-year-old intrusive rocks (Flat area); (2) complex gold-polymetallic deposits associated with dike swarms of quartz-rich igneous rocks (Donlin area); and (3) heavy-mineral placer deposits (both Flat and Donlin areas). Obtaining geophysical signatures for both lode deposit types in the Flat and Donlin districts as part of an airborne-geophysical/geological ground-truth survey of the entire Iditarod mining district would assist in identifying and delineating other as yet unrecognized mineral deposits in southwestern Alaska.

Products resulting from these surveys would include:

1. 1:63,360-scale aeromagnetic and airborne-electromagnetic maps
2. 1:63,360-scale mineral occurrence maps
3. 1:63,360-scale land status map
4. Various other geological, geochemical, and geophysical data compilations

#### PROJECT COST

The cost of an airborne-geophysical/geological mineral inventory varies with the size of the survey tract, its location, and the charges proposed by participating geophysical contractors. In the past, completion of geophysical/geological surveys of single minimal but reasonably sized tracts has required about \$400,000 in CIP funds augmented by Federal Receipt grants and General Fund base-budget money. Up to 25 percent of the

CIP funds are reserved to help pay for the collection of ground-truth geological framework data needed by the private sector and DGGS to interpret the airborne geophysical maps. The ground-truth geological work costs between \$1.50 and \$2.00 per acre or \$240,000 to \$320,000 for an area equivalent to one 1:63,360-scale quadrangle. Pooling of funds from all three sources (CIP, Federal and GF-base) is required to cover this expense.

The distribution of CIP funds for each proposed tract in the FY98 Alaska Airborne Geophysical/Geological Mineral Inventory project would approximate the schedule that follows.

	FY99
Project personnel	\$50.0
Travel (logistical field travel)	2.0
Geophysical contract, geochemical analyses, helicopter, etc.	338.0
Commodities (GIS, office, field supplies)	10.0
Equipment	0.0
<b>TOTAL</b>	<b>\$400.0</b>

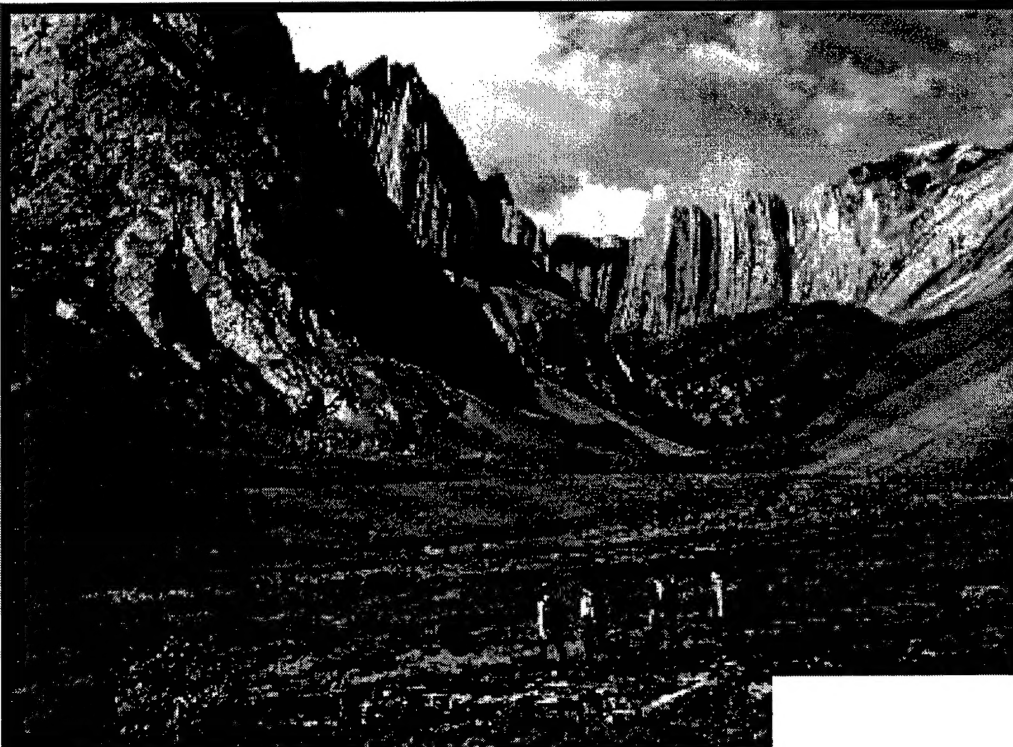
#### ECONOMIC DEVELOPMENT

A primary objective of this project is the stimulation of the state's mineral-based economy by delineating the location of mineral zones within the state's most prospective mineral districts. Experience has shown that this information encourages the investment of millions of dollars in private mineral exploration funds in the short term and leads to long-term job and revenue creation as discovered mineral deposits are brought into production.

#### PROJECT STAGING

The projects proposed for FY99 are staged over the period 1998 through 2001. The new geophysical data would be released in February of 1999. Required geologic ground-truth inventory data would be released in FY00 and FY01.





## DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS

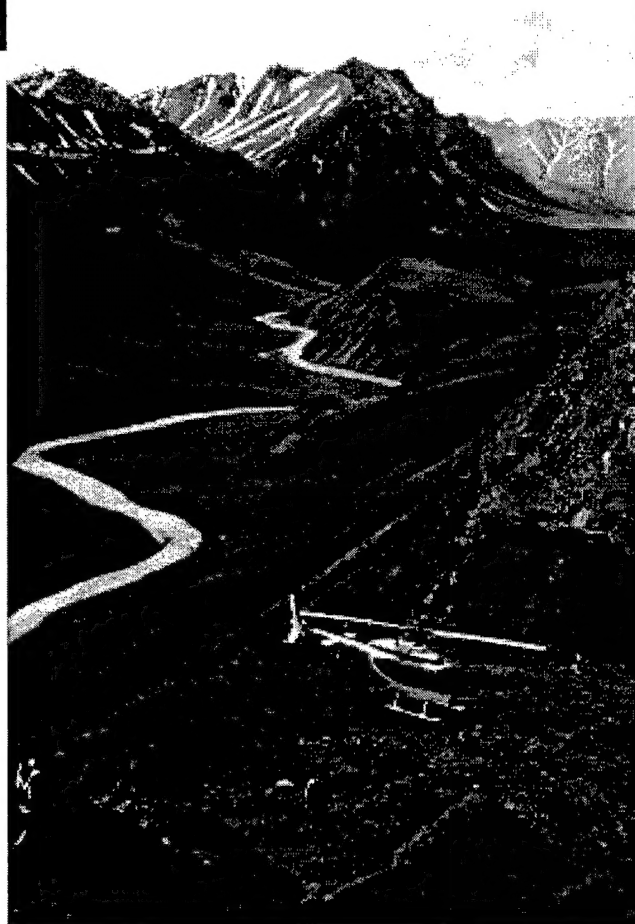
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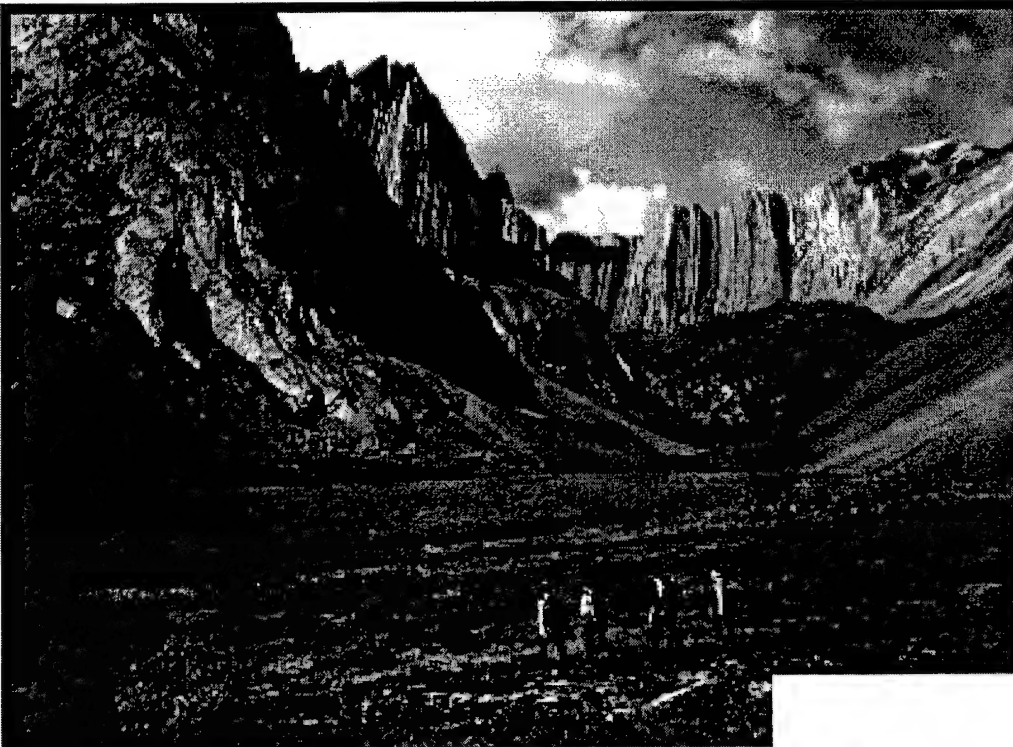
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# FY99 PROGRAM SUMMARY





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# FY99 PROGRAM SUMMARY

**DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS**  
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**Fairbanks, Alaska 99709-3645**  
**Phone: (907) 451-5010**

**EVOLUTION OF THE DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS (DGGS)**

Territorial Department of Mines, 1959  
Division of Mines and Minerals, 1959-66  
Division of Mines and Geology, 1966-70  
Division of Geological Survey, 1970-72  
Division of Geological & Geophysical Surveys, 1972-Present



**LEADERSHIP**

Seven qualified professional geoscientists have served as State Geologist:

Jim Williams, 1959-71  
William Fackler, 1971-73  
Donald Hartman, 1973-75  
Ross G. Schaff, 1975-86  
Robert B. Forbes, 1987-1990  
Thomas E. Smith, 1991-1995  
Milton A. Wiltse, 1995-Present

The State Geologist also serves as a division director within the Department of Natural Resources (DNR) and is appointed by the DNR Commissioner. Since the early 1970s, the State Geologists have been selected from lists of candidates prepared by the geological community and professional societies within Alaska—similar to the process by which judicial appointees are selected. The qualifications and responsibilities of the State Geologist and the mission of DGGS are defined by statute.

**STATUTORY MANDATES**

**Alaska Statutes Sec. 41.08.010. Division of geological and geophysical surveys.** There is established in the Department of Natural Resources a division of geological and geophysical surveys under the direction of the state geologist. (1 ch 93 SLA 1972)

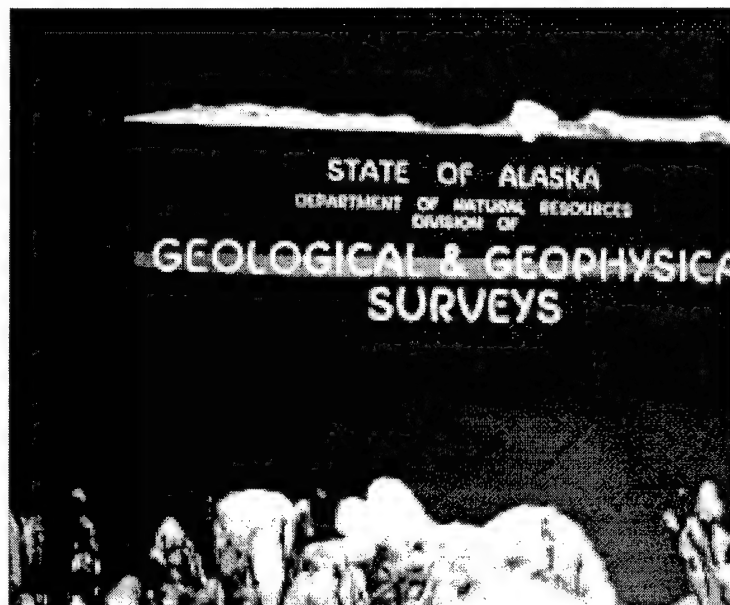
**Sec. 41.08.015. State geologist.** The commissioner of natural resources shall appoint the state geologist, who must be qualified by education and experience to direct the activities of the division. (1 ch 93 SLA 1972)

**Sec. 41.08.020. Powers and duties.** (a) The state geologist shall conduct geological and geophysical surveys to determine the potential of Alaskan land for production of metals, minerals, fuels, and geothermal resources; the locations and supplies of groundwater and construction materials; the potential geologic hazards to buildings, roads, bridges and other installations and structures; and shall conduct such other surveys and investigations as will advance knowledge of the geology of Alaska. With the approval of the commissioner, the state geologist may acquire, by gift or purchase, geological and geophysical reports, surveys and similar information.

## LOCATION

Current DGGGS staff strength totals 23 professional and support personnel, plus seven geologic assistants hired through the University of Alaska Fairbanks Research Assistant Program.

The administrative headquarters were moved to Fairbanks in 1987. The close proximity of the division and the earth science research laboratories of the University of Alaska Fairbanks campus has a strategic benefit to the DGGGS program. University staff and students are important adjunct members of many DGGGS project teams.

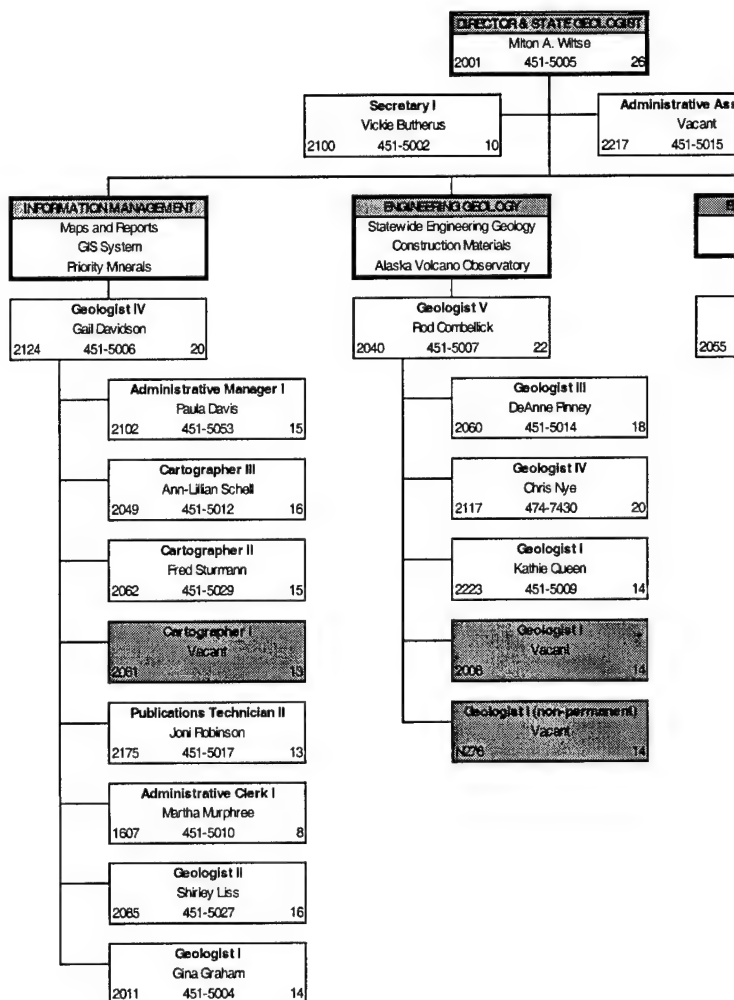


The Eagle River compound comprises the DGGGS Geologic Materials Center (GMC). The GMC is a repository for geologic samples of oil- and gas-related well cores and cuttings, mineral deposit core samples, and regional geologic voucher samples. These materials are used by industry to enhance the effectiveness and success of private-sector mineral and energy exploration ventures. New materials are continuously acquired. Use of the materials at the GMC is free to the public. The GMC is staffed by a geologist, who has established a network of volunteers to assist him and ensure continuous public service at the facility.



## ORGANIZATION

The Division of Geological & Geophysical Surveys is organized into three sections: Statewide Minerals and Energy; Statewide Engineering Geology; and a Geologic Communications section. DGGS also has a Geologic Materials Center that is managed by one full-time professional geologist in Eagle River, Alaska.



The mission of the **Division of Geological & Geophysical Surveys (DGGS)** is summarized in AS 41.08.020. The division collects, analyzes, interprets, and publishes data on Alaska's geologic resources as a stimulus to private-sector resource development, to facilitate effective management of Alaska's lands, and to mitigate the impact of natural geologic hazards. The division is also charged with the task of advancing the general knowledge of the geologic framework of the state.

The **Mineral and Energy Resources Section** collects, analyzes, and makes available information on the



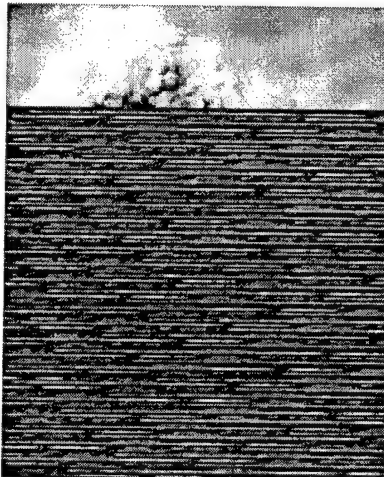
geologic framework of Alaska as it pertains to the mineral and energy resources of the state. Summary maps and reports illustrate the geology of the state's prospective terranes and provide

data on the location, quality, and quantity of the state's mineral, coal, and geothermal resources.

The **Geologic Materials Center** is the state's single central repository for representative geologic samples of oil- and gas-related well cores and cuttings, mineral deposit core samples, and regional geologic voucher samples. These materials are routinely used by industry to enhance the effectiveness and success of private-sector mineral and energy exploration ventures. New materials are continuously acquired. Access to the materials at the GMC is free to the public. To ensure that the value of the GMC holdings are maintained over time, any new data generated from privately funded analyses of the geologic materials must be donated to the GMC database.

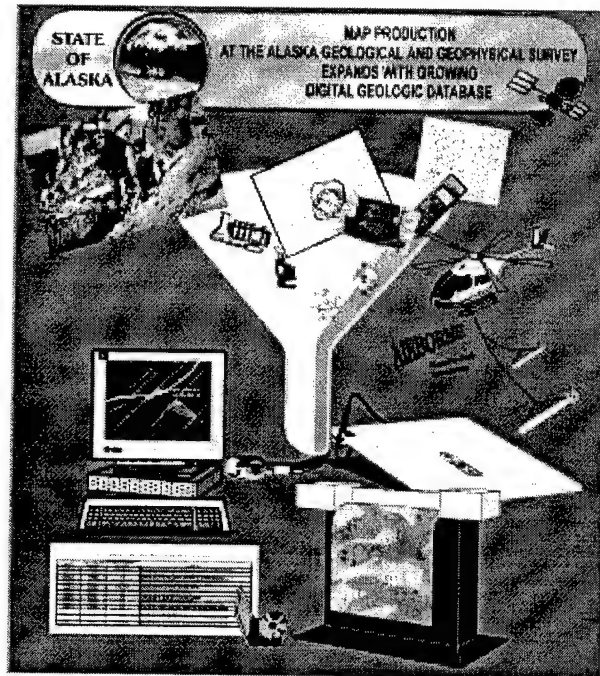
The **Engineering Geology Section** collects, analyzes, and compiles geologic data useful for engineering purposes. Surficial-

geologic maps portray the distribution of sediment types and provide information on their engineering properties and usefulness as construction materials. Studies of major geologic hazards like earthquakes, volcanoes, and land-



slides result in reports outlining potential impacts on susceptible areas and expected frequencies of occurrence.

The **Geologic Communications Section** has the primary responsibility for transferring division-generated geologic information to the public and for maintaining and improving public accessibility to the DGGs geologic information database. Increasing utilization of computer technology is resulting in faster preparation of maps and reports and a wider awareness of Alaska geologic information available at DGGs. The section



responds each year to an estimated 2,500 public inquiries about geologic resources in the state of Alaska.

The **Director's Office** provides strategic planning for the division's programs to insure that DGGs is meeting the needs of the public within the guidelines of AS 41.08.020, manages the division's fiscal affairs, and provides personnel and clerical services. The Director acts as a liaison between the division and local, state, federal, and private agencies; seeks out and encourages cooperative geologic programs of value to the state, and advises the Commissioner of the Department of Natural Resources about geologic issues.



## INTERAGENCY COOPERATION

### Other DNR Divisions

In most years DGGS provides other DNR agencies with routine analyses and reviews of various issues such as hazards evaluations of pending oil lease tracts, geologic assessments of land trades, selections, or relinquishments, mineral potential, construction materials, etc. DGGS works closely with the State Pipeline Coordinators Office (SPCO) when geotechnical information about future access corridors is needed. We have an increasing amount of interaction with the Land Records Information System (LRIS) group in the Division of Support Services as more of our geologic data is compiled and organized in digital format amenable to merging with other land information. The DGGS energy group often works with geologic personnel in the Division of Oil and Gas (DOG) on issues related to rural energy sources and in providing near-surface geologic control for the subsurface oil-related geologic analyses conducted by DOG. DGGS supplies the Division of Forestry (DOF) with information about the mineral resource potential within state forests.

Funding for DNR support work has mostly come from our yearly general fund appropriation. For larger efforts, however, the work is supported by interagency transfers, Capital Improvement Project funding, or federal grants that supplement DGGS general fund appropriations. We are not currently engaged in any major interagency cooperative DNR projects.

In summary, the Geological Survey provides an ongoing geologic consulting service to other DNR divisions and line agencies of state government. Typically these activities occupy from 10 to 15 percent of our total effort. Over the last few years, interagency funding from other DNR divisions has been about one percent of our total budget.

### Local Government

Most of the cooperative efforts implemented by DGGS with borough and municipal governments are conducted on a mutually beneficial but informal basis. A notable exception is the cooperative effort with the City of Wrangell in FY97. The City of Wrangell transferred \$200,000 to DGGS to partially pay for the geophysical survey of high potential mineral lands near the city.

Wrangell's \$200,000 was matched by \$300,000 from the U.S. Bureau of Land Management and an in-kind contribution of DGGS expertise to oversee the implementation of geophysical surveys through the use of private-sector contractors.

### University of Alaska

DGGS has had a long and productive professional association with the geoscientists and students in various departments of the University of Alaska. University of Alaska faculty work as project team members on many DGGS projects and provide special analytical skills for generating geochemical and radiometric-age data. University student interns also are an important part of the DGGS work force. While working on current DGGS projects, the students learn a wide variety of geology related skills ranging from conventional geologic mapping and sample preparation techniques to modern digital database creation and geographic information systems. DGGS and the University make frequent use of each others libraries and specialized equipment.

### Federal Agencies

DGGS has ongoing cooperative programs with the U.S. Geological Survey (USGS) and the U.S. Bureau of Land Management (BLM). Periodically, DGGS also expects to have cooperative programs with the U.S. Minerals Management Service and the Department of Energy. We have recently initiated a cooperative program with BLM to upgrade the Alaska Geologic Materials Center in Eagle River. DGGS also receives federal funds in the form of matching grants for which we must compete with other organizations on a yearly basis. In the past we have been successful in securing funds to support mineral inventory mapping, surficial and earthquake hazards-related mapping, volcanic-hazards-related work and studies related to oil and gas potential in Cook Inlet and the North Slope. We are not, however, assured of yearly success for any of our federal grant proposals. These funds, therefore, sometimes complement but do not replace General Fund money.



**ALASKA GEOLOGIC MAPPING ADVISORY BOARD**

The Alaska Geologic Mapping Advisory Board aids the Division of Geological & Geophysical Surveys in its goal of providing earth science information to the Alaskan public. A number of prominent leaders in the geological community with a variety of backgrounds and a broad spectrum of experience in Alaska have agreed to serve on the advisory board. The purpose of the board is multifold:

- To identify strategic geologic issues that need to be addressed by the State.
- To inquire into matters of community interest relating to Alaska geology.
- To provide a forum for collection and expression of opinions and recommendations relating to geologic investigation and mapping programs for Alaska.
- To make recommendations toward identifying Alaska's diverse resources and promoting an orderly and prudent inventory of those resources.
- To increase public awareness of the importance of geology to the state's economy and to the public's health and safety.
- To promote communication among the general public, other government agencies, private corporations, and other groups that have an interest in the geology and subsurface resources of Alaska.
- To facilitate cooperative agreements between DGGS and other agencies, professional organizations, and private enterprise to develop data repositories and to enhance the state's resource inventory and engineering geology programs, and to communicate with public officials as representatives of groups interested in the acquisition of Alaska geologic information.
- To enlist public support for statewide geologic resource inventories and engineering geology programs.

Members of the board are:



Gerald G. (Jerry) Booth  
Vice President  
Cook Inlet Region, Inc.



John Sims  
Vice President  
Usibelli Coal Mine, Inc.



James Rooney  
President, R & M Consultants



Harold Noyes  
Natural Resource Manager  
Doyon, Limited



David Hite  
President, Hite Consultants



Carl Benson  
Professor Emeritus, Geology  
University of Alaska Fairbanks



Richard Glenn  
North Slope Borough  
Energy Management

The board held its first meeting in Fairbanks on October 22, 1995, and meets at least three times a year to discuss state needs, review DGGS programs, and provide recommendations to the State Geological Survey. The members solicit and welcome comments and suggestions from the public concerning state needs and DGGS programs.

## FY97 ACCOMPLISHMENTS

The activities of the Division of Geological & Geophysical Surveys (DGGS) during FY97 were tightly focused on generating geologic information and services that would help Alaska expand and diversify its economy and contribute to public safety. The division has produced a host of products that have resulted or will result in the desired outcomes. We do not have quantitative measures for each product, but we do have data that clearly illustrate the aggregate effect of the geologic information and services provided.

In 1997, about \$51 million was spent on Alaska mineral exploration, \$152 million on mineral development, and the value of mineral production was \$885 million. This compares with \$44.6, \$394, and \$590.4 million respectively for 1996. Addition of these three components gives a total value for the minerals industry of \$1,088 million in 1997, compared to \$1,029 million in 1996. Over 4,000 new mining claims have been located in the state in calendar year 1997. We attribute much of this activity to a response to the state's mining incentive tax credit and its investment in geophysical and geological mineral surveys of Alaska's most prospective state lands.

Our engineering geology section has taken on and is accomplishing the task of compiling, normalizing, and interpreting the surficial materials data from thousands of public and private-sector geotechnical bore-holes and water wells in the greater Anchorage area. This is a multi-year project but useful interim products have already been produced. A new surficial geologic map will be released in FY98, and geotechnical derivative products will quickly follow in FY99. These will include maps useful for guiding building, road, and other infrastructure design, and improved maps of seismic risk needed for seismic hazard response planning and hazard mitigation planning. All of these activities improve public safety.

The division's energy section worked in two arenas during FY97: the western Arctic Slope oil province and interior basin coal provinces. The western Arctic Slope work was designed to gather geologic information that would improve the likelihood of discovering oil in the subsurface of the basin portion of the National Petroleum Reserve, Alaska (NPRA). Work there has documented the presence of source and reservoir rocks within the favorable temperature and pressure ranges of the "oil window," and private-sector interest in ex-

ploring NPRA has increased substantially. The division's work in the state's coal provinces has been targeted at identifying sites near rural villages that have a high potential for the presence of shallow coalbed methane that could be used for generating heat and power. There is a growing need for energy sources in rural Alaska to support local industry and to decrease the cost to the state of subsidizing fuel shipments.

The geo-communication section of DGGS is pioneering new avenues for making the state's mineral, energy, and geotechnical geologic data available while maintaining production of our traditional paper-based maps and reports. Good progress has been made with on-line data referencing of the division's maps and reports. An Internet site and newsletter have been developed to provide up-to-date information about division work and new products. This group is also the driving force in reducing the cycle time between field data generation and summary maps and reports released to the public. Our goal is to have useful new products from every division project in the hands of the public every year.

DGGS's Geologic Material Center negotiated several remarkable acquisitions in FY97 that are being completed as this summary is being written. The Center now has the entire Shell Oil Company collection of Alaska oil well samples, as well as those of Marathon Oil Company. These collections are large, comprehensive, and include material from many of the pioneering wells on Alaska's North Slope and Cook Inlet that established the geologic models that are currently being used to explore for more oil. They are materials that will remain of fundamental strategic importance to the state's oil industry as exploration models are reinterpreted and evolve to find the oil that will be needed to generate state revenues in the future. Although the Center was engaged in many other activities as well, the Shell negotiation alone added over 14 full-sized tractor-trailer van loads of core materials to the facility at a cost of about \$250,000 to Shell Oil Company.

As a part of the division's public education and outreach efforts, DGGS staff served as science fair judges, made visitations to elementary and high schools, acted as visiting professors at the University of Alaska Fairbanks, and worked on-site with student interns. DGGS also sponsored informational booths at trade fairs, professional mining and petroleum development conventions, and various other public forums to disseminate

nate information about geologic resource investment opportunities in Alaska.

#### Project Summaries

- Prepared and published *Alaska's Mineral Industry 1996*, an annual report on statewide mining activity, in cooperation with the DNR Division of Mining and Water Management and Department of Commerce and Economic Development. Circulated both nationally and internationally, *Alaska's Mineral Industry 1995* report helped attract \$202 million in mineral exploration and development investments to the state this year (1997).
  - Completed a detailed airborne geophysical survey of an additional 330 square miles in the Rampart-Manley mining areas, 360 square miles in the Chulitna mining district, and 415 square miles in the Petersville mining district. The FY97 Rampart-Manley survey data were merged with geophysical data acquired in FY96, providing a merged geophysical data set over about 1,000 square miles. Forty-five geophysical maps and digital data products were released to the public. This new geophysical data is encouraging private-sector investment in mineral exploration and development of mineralization in these rural mining districts. New claims have been located in all three survey tracts.
  - Completed three weeks of helicopter-supported geologic field mapping in the Tanana A-1 and A-2 quadrangles. This was the scheduled second year of ground truth geologic follow-up of FY96 and FY97 airborne geophysical surveys of these quadrangles. A preliminary field compilation of new geologic data has been produced. Final 1:63,360-scale geologic maps will be released in FY98.
  - Completed and published a series of five 1:63,360-scale geologic and derivative maps of the Tanana B-1 Quadrangle as part of the federally funded StateMap Program. This detailed geologic map covers part of the important Rampart-Manley mining district that was geophysically surveyed in FY96. Economic viability of mining in this region is enhanced by its accessibility to Alaska's highway system.
  - Published a 1:125,000-scale geologic map of the eastern half of the McGrath Quadrangle in both traditional paper format and as an electronic map.
- Funded by the U.S. Geological Survey federal digital StateMap program, this compilation of previously-published and updated unpublished mapping and accompanying text describes the geology and resource potential of a highly mineralized region centered in the Farewell silver-lead-zinc district southeast of McGrath. Potentially important coal resources flanking the Alaska Range are also described in the map area and structural and stratigraphic interpretations will assist in future basin evaluations. In addition to large tracts of state land, major landowners in the region include Cook Inlet Region Inc. and Doyon Ltd. regional native corporations. All have lands open to mineral entry and development.
- Completed the first phase of the Alaska Coalbed Methane Resources CIP project to identify rural communities with potential for onsite or nearby producible coalbed methane resources. Three areas, western Colville Basin, Yukon Flats, and Chignik "Basin" have sufficient data to warrant advanced coalbed methane resource exploration. Other rural areas of Alaska may have coalbed methane potential, but were determined to be higher exploration risks due to lack of critical coalbed methane gas generation and production parameters, current lack of data, or lack of a local market.
  - Completed updating and correcting the Alaska portion of the U.S. Geological Survey's National Coal Resource Data System (NCRDS). This database contains available published and unpublished Alaska coal resource information including coal seam locations, thickness, depth, quality and biostratigraphic information along with data on overburden. The database is a primary fundamental source of data for any group considering development of Alaska's coal resources. The NCRDS database for the contiguous United States is currently available on the World Wide Web through the U.S. Geological Survey.
  - In FY97 the Tingmerkpuk project acquired stratigraphic and geochemical data that will foster oil and gas exploration plays on the western Arctic Slope. Of particular significance are data that indicate the presence of rich oil-prone source rocks. A consortium of six oil industry companies and regional Native corporations cooperatively sponsored this project with DGGS.

- As part of its public outreach efforts, many professional staff at DGGs participated as judges in science fairs at local schools; some taught geology classes at schools as well. Two professional staff members also taught individualized geology courses to University of Alaska students.
  - Completed surficial-geologic mapping of the proposed road corridor between Ophir and Poorman, published as part of the *Preliminary geologic map and data tables from the Ophir C-1 and western Medfra C-6 Quadrangles (DGGs Public Data File 97-46)*. This map and a soon-to-be-published derivative engineering-geologic map will help in selection of the best road alignments between Ruby and McGrath and will help identify sources of construction materials.
  - Published surficial-geologic and derivative construction materials and hazards maps for the northern part of the Rampart–Manley mining district. The results are being used by DOTPF for designing the planned road from Eureka to Rampart and by private consultants for assessing placer-gold potential in the Rampart area.
  - Completed a derivative engineering-geologic map of the eastern half McGrath Quadrangle. This map accompanies the general geologic map and will be beneficial for locating construction materials and evaluating engineering constraints for future development in the area.
  - Prepared a proposal for DGGs participation in a federally funded, cooperative project to perform geologic evaluations of proposed transportation corridors that would provide overland access to valuable state lands.
  - As part of the division's public-education and outreach efforts, the Engineering Geology section prepared field-guide reports on the geologic and earthquake history of upper Cook Inlet and Kenai Lowlands, and helped lead field trips in these areas conducted by the Alaska Geological Society and United Nations International Geologic Correlation Project.
  - Provided engineering-geologic evaluation on a state-federal interagency field inspection of the proposed location for a South Denali visitor's center in Denali State Park. The results reported back to the cooperating agencies will help guide consideration of geologic factors in site development proposals.
- These factors include availability of construction materials, potential engineering constraints, and geologic education topics for visitors.
- Developed a database of subsurface geotechnical data for the Anchorage area for eventual public access and for use in developing improved engineering-geologic and seismic-zonation maps. The results will promote building safety and emergency response in Anchorage by providing useful information on subsurface conditions and identification of areas likely to experience amplified ground motion during major earthquakes.
  - Digitally reproduced the existing seismic ground-failure hazard map of Anchorage and rectified it with updated topographic and street base maps for use by the Municipality of Anchorage in conjunction with existing local earthquake-related zoning regulations. The new map allows the municipality and the public to more accurately locate roads and building sites in relation to the mapped hazard zones.
  - Presented information on earthquake hazards in the Fairbanks area at a training workshop on post-earthquake building-safety evaluation for local engineers, building officials, and emergency planners. DGGs involvement in this workshop helps ensure that those who are responsible for seismic safety of buildings have the necessary geologic background to help provide accurate and efficient safety evaluations.
  - Collaborated with representatives from other western states in a USGS-sponsored workshop to develop a 5-year plan for the National Earthquake Hazards Reduction Program. The goal of this program is to reduce economic losses and casualties from future earthquakes by developing and disseminating information on earthquake hazards that can be used by engineers, planners, and emergency officials to improve building design and public safety. DGGs involvement in this workshop helps ensure that the plans for this program adequately address Alaskan concerns and issues regarding earthquake hazards.
  - Participated in a USGS-sponsored workshop to provide data for a set of generalized statewide seismic-hazards maps of Alaska. The maps will depict probable levels of earthquake ground-shaking forces to be expected on bedrock sites at any location in the state. Engineers will be able to directly use these

values, together with maps of local site effects, for the safe design of structural elements of buildings, roads, bridges, etc. DGGS involvement in this workshop ensures that the special knowledge of DGGS geologists regarding fault activity and earthquake recurrence rates is incorporated into the USGS maps.

- Participated in a FEMA-sponsored workshop to develop earthquake planning scenarios for the Anchorage area. DGGS involvement in this workshop helps ensure that accurate and realistic scenarios for earthquakes in the Anchorage area are used for emergency response planning. Response exercises based on these scenarios will improve the effectiveness and efficiency of emergency response in the event of a real, damaging earthquake.
- Represented Alaska on the Western States Seismic Policy Council, which provides a forum for communication between geoscience and emergency management professionals and develops policy recommendations for state and local governments to consider in reducing earthquake risks. These policy recommendations may include public education programs, hazard mapping, zoning regulations, building codes, insurance, or emergency-response planning, and are left to the discretion of state and local lawmakers to consider, modify, and implement or disregard as appropriate.
- Responded to approximately 72 requests for technical assistance or information on engineering-geology issues in Alaska: state agencies (31), federal agencies (8), local government (2), industry (10), academia (10), private individuals (11).
- Participated in the Alaska Volcano Observatory (AVO), a three-way partnership between DGGS, the U.S. Geological Survey, and the University of Alaska to monitor volcanic activity, evaluate hazards, issue formal warnings of impending eruptions, and provide public-safety information during eruptions in progress.
- Provided overall logistical coordination and management for expansion of AVO volcano monitoring capabilities in the eastern Aleutian Islands and on the Alaska Peninsula. Expanded monitoring of active Aleutian volcanoes will ensure accurate and timely reporting of volcanic activity along this major airline and air cargo route. As a result, air carriers can confidently continue using Alaskan airports and can expand their routes into and over Alaska knowing that they will receive the information they need to avoid damage by airborne volcanic ash.
- Developed and maintains the Internet site that provides the primary internal and external communications links for the Alaska Volcano Observatory (AVO). AVO activities provide increased public safety with respect to volcanic eruptions by monitoring the path and severity of airborne ash clouds and by giving advanced warning of eruptive events. AVO activities are economically significant because they provide the degree of safety demanded by the airline industry to maintain intercontinental airfreight schedules into Anchorage and Fairbanks and across the Aleutian volcanic island chain. Servicing intercontinental airfreight carriers has become a multi-million-dollar source of revenues for the Anchorage and Fairbanks airports and provides scores of local employment opportunities.
- Received, along with other AVO partner agencies, the federal National Performance Review "Hammer" award from Vice President Gore for helping "build a government that works better and costs less."
- In FY97 DGGS established a site on the World Wide Web. The DGGS Home Page includes an active map of Alaska that is programmed to retrieve a comprehensive bibliography of DGGS publications for areas defined by the user. This system enables potential customers anywhere in the world to quickly determine what DGGS geologic publications are available for any area of the state. It saves professional geoscientists hours to days of time in conducting the library research necessary when planning geological resource exploration or development projects.
- A triannual newsletter, *Alaska GeoSurvey News*, was initiated in 1997 to inform the Survey's customers about newly available geologic and geophysical data, reports, and maps. The newsletter also contains articles about major DGGS programs and progress being made with ongoing projects. The newsletter helps DGGS expedite the dissemination of new geologic information and helps maintain the momentum of economic diversification currently taking place in the mineral resource industries.



- DGGS is summarizing an increasing amount of geological data and information in electronic versions of geological and geophysical maps and reports. These products are in increasing demand by DGGS customers because they allow the rapid integration of DGGS data into the geographic information systems (GIS) of companies and individuals actively engaged in Alaska resource development. Electronic products were produced for the Rampart, McGrath, Sleetmute, Bethel, Upper Chulitna, Petersville, and Wrangell, areas.
  - In cooperation with ARCO, an electronic data and map compilation of a multi-million dollar set of geologic, geophysical, and geochemical data was completed for the Kandik Basin oil province in east-central Alaska. Native corporations and others in the private sector are using this product to solicit new exploration investment in that region.
  - During FY97 6,354 publications were either sold or distributed free to 1,429 customers. At the DGGS office, income generated from those sales totaled \$21,704.17. A new component of sales is the dissemination of electronic data by tape and CD-ROM to meet an increasing demand for DGGS data in electronic format.
  - Presided over information booths at several conferences in FY97, including the Alaska Miner's Association meeting, the Vancouver Roundup, the Solstice booth in Fairbanks, and meetings in Whitehorse and Spokane. These conventions are effective forums in which to bring Alaska's geologic resource potential to the attention of corporate and individual geoscience professionals who make policy decisions on where to invest their company's venture capital. Several of the mining companies now active in Alaska are here because of geologic resource information brought to their attention at a DGGS convention trade booth.
- Unscheduled Products**
- (These products were not included in the FY97 DGGS budget but are the result of new opportunities presented to the division throughout the year.)
- Using the DNR Land Records Information System (LRIS), land status and mining claim location maps for the Rampart-Manley, Chulitna, and Petersville areas were produced for the geophysical survey tracts. Maps of existing claim locations and land status help explorationists plan mineral exploration programs by identifying terrain in which others have recognized mineralization and by identifying lands open to mineral entry.
  - Completed the data acquisition and release for an aeromagnetic survey of a 3,900 square mile area near Bethel in southwestern Alaska. An aeromagnetic map product was released to the public. These data will assist efforts to identify geologic structures and igneous intrusions affecting exploration for local sources of natural gas for use by residents in that region.
  - Completed airborne geophysical data acquisition of more than 1,000 square miles of prospective mineral lands near Wrangell, Alaska. This project, funded by the U.S. Bureau of Land Management and the City of Wrangell, was undertaken in an attempt to encourage mineral exploration in an area that has been hurt economically by the loss of the Southeast Alaska timber industry. The new geophysical data was released in September and has encouraged new claim acquisitions in the Duncan Canal portion of the survey tract.
  - Negotiated a contract for a geophysical survey of part of the Wiseman mining district in the northeastern Brooks Range. This cooperative project is funded by the U.S. Bureau of Land Management and implemented by DGGS. The new geophysical data will encourage private-sector investment in mineral exploration and development of mineralization in this rural mining district.
  - Published as professional reports 1:63,360-scale geologic maps of the Chandalar B-6 and C-6 quadrangles. These map areas are located in the Wiseman Gold District—an area of historic hard-rock and placer gold exploration and production that is within the current airborne geophysical survey tract funded by the USBLM.
  - An informational poster with preliminary analytical results generated from some of the recently acquired samples collected during the Tingmerkpuk project was presented at the annual meeting of the American Association of Petroleum Geologists in April 1997, and a summary was presented to the May 1997 meeting of the Alaska Geological Society. Both of these forums included attendees from the oil industry and therefore provided a good opportunity to publicize the new information and en-



courage its use in catalyzing new oil and gas exploration programs.

- Provided expertise and field guide to USGS project members involved in the new Department of Interior appraisal of the hydrocarbon potential of ANWR, and attended and commented on two workshops in which the USGS presented some of their geological data used in their resource appraisal.

#### **Scheduled Products Not Completed in FY97**

- A summary report detailing coalbed methane-related geology of seven remote Alaskan basins determined to have potential for coalbed methane resources. Will be released in FY98.
- Summary reports of analytical organic geochemistry, micropaleontology, apatite fission track uplift history, megafossil identifications, and potassium-argon dating for stratigraphic units in the Tingmerkpuk region of the western Arctic Slope. Will be released in FY98.

#### **New Geologic Information Generated by DGGS in FY97**

##### **Reports of Investigation**

- RI 96-6a. Geologic investigations of the Kandik area, Alaska, and adjacent Yukon Territory, Canada**, by Gerald K. Van Kooten, Arthur B. Watts, James Coogan, Van S. Mount, Robert F. Swenson, Paul H. Daggett, James G. Clough, Charles T. Roberts, and Steven C. Bergman, in cooperation with Arco Alaska, Inc. and Doyon Ltd., 1997, 3 sheets, scale 1:125,000. \$39.
- RI 96-6b. Station locations in the Kandik area, Alaska, and adjacent Yukon Territory, Canada**, by Gerald K. Van Kooten, Arthur B. Watts, James Coogan, Van S. Mount, Robert F. Swenson, Paul H. Daggett, James G. Clough, Charles T. Roberts, and Steven C. Bergman, in cooperation with Arco Alaska, Inc. and Doyon Ltd., 1997, 1 sheet, scale 1:125,000. \$13.
- RI 96-6c. Gravity maps of the Kandik area, Alaska, and adjacent Yukon Territory, Canada**, by Gerald K. Van Kooten, Arthur B. Watts, James Coogan, Van S. Mount, Robert F. Swenson, Paul H. Daggett, James G. Clough, Charles T. Roberts, and Steven C. Bergman, in cooperation with Arco Alaska, Inc. and Doyon Ltd., 1997, 1 sheet, scale 1:250,000. \$13.
- RI 97-1. Total field magnetics and electromagnetic anomalies of the Chulitna mining district, Alaska**, by DGGS, Dighem, and WGM, 1997, 1 sheet, 3 colors, scale 1:63,360. \$4.
- RI 97-2. Total field magnetics of the Chulitna mining district, Alaska**, by DGGS, Dighem, and WGM, 1997, 1 sheet, full color, scale 1:63,360. On-demand color plot from electronic file, 400 dpi. \$10.
- RI 97-3. 900 Hz resistivity contours of the Chulitna mining district, Alaska**, by DGGS, Dighem, and WGM, 1997, 1 sheet, full color, scale 1:63,360. On-demand color plot from electronic file, 400 dpi. \$10.
- RI 97-4. 7200 Hz resistivity contours of the Chulitna mining district, Alaska**, by DGGS, Dighem, and WGM, 1997, 1 sheet, full color, scale 1:63,360. On-demand color plot from electronic file, 400 dpi. \$10.
- RI 97-5. Total field magnetics and electromagnetic anomalies of the Petersville mining district, Alaska**, by DGGS, Dighem, and WGM, 1997, 1 sheet, 3 colors, scale 1:63,360. \$4.
- RI 97-6. Total field magnetics of the Petersville mining district, Alaska**, by DGGS, Dighem, and WGM, 1997, 1 sheet, full color, scale 1:63,360. On-demand color plot from electronic file, 400 dpi. \$10.
- RI 97-7. 900 Hz resistivity contours of the Petersville mining district, Alaska**, by DGGS, Dighem, and WGM, 1997, 1 sheet, full color, scale 1:63,360. On-demand color plot from electronic file, 400 dpi. \$10.
- RI 97-8. 7200 Hz resistivity contours of the Petersville mining district, Alaska**, by DGGS, Dighem, and WGM, 1997, 1 sheet, full color, scale 1:63,360. On-demand color plot from electronic file, 400 dpi. \$10.
- RI 97-9. Extended coverage of the total field magnetics and electromagnetic anomalies of the Rampart-Manley mining district, Alaska**, by DGGS, Dighem, and WGM, 1997, 3 sheets, 3 colors, scale 1:63,360. \$12.

- RI 97-10. Extended coverage of the total field magnetics of the Rampart-Manley mining district, Alaska**, by DGGS, Dighem, and WGM, 1997, 2 sheets, full color, scale 1:63,360. On-demand color plot from electronic file, 400 dpi. \$26.
- RI 97-11. Extended coverage of the 900 Hz resistivity contours of the Rampart-Manley mining district, Alaska**, 2 sheets, full color, scale 1:63,360. On-demand color plot from electronic file, 400 dpi. \$26.
- RI 97-12. Extended coverage of the 7200 Hz resistivity contours of the Rampart-Manley mining district, Alaska**, 2 sheets, full color, scale 1:63,360. On-demand color plot from electronic file, 400 dpi. \$26.
- RI 97-14a. Geologic map of the eastern half of the McGrath Quadrangle, Alaska**, by T.K. Bundtzen, E.E. Harris, and W.G. Gilbert, 1997, 34 p., 1 sheet, scale 1:125,000. \$17.
- RI 97-14b. Derivative map of the geologic materials and hazards in the eastern half McGrath Quadrangle, Alaska**, J.T. Kline and D.S. Pinney, 1997, 1 sheet, scale 1:125,000. \$13.
- RI 97-15a. Geologic map of the Tanana B-1 Quadrangle, central, Alaska**, by R.R. Reifenhuth, J.H. Dover, D.S. Pinney, R.J. Newberry, K.H. Clautice, S.A. Liss, R.B. Blodgett, T.K. Bundtzen, and F.R. Weber, 1997, 17 p., 1 sheet, scale 1:63,360. \$15.
- RI 97-15b. Interpretive geologic bedrock map of the Tanana B-1 Quadrangle, central, Alaska**, by R.R. Reifenhuth, J.H. Dover, R.J. Newberry, K.H. Clautice, S.A. Liss, R.B. Blodgett, T.K. Bundtzen, and F.R. Weber, 1997, 15 p., 1 sheet, scale 1:63,360. \$14.50
- RI 97-15c. Surficial geologic map of the Tanana B-1 Quadrangle, central Alaska**, by DeAnne S. Pinney, 1997, 5 p., 1 sheet, scale 1:63,360. \$14.
- RI 97-15d. Derivative geologic materials map of the Tanana B-1 Quadrangle, central Alaska**, by DeAnne S. Pinney, 1997, 1 sheet, scale 1:63,360. \$13.
- RI 97-15e. Derivative map of potential geologic hazards of the Tanana B-1 Quadrangle, central Alaska**, by DeAnne S. Pinney, 1997, 1 sheet, scale 1:63,360. \$13.
- RI 97-16a. Total field magnetics and electromagnetic anomalies of the Stikine area, Southeast Alaska, Map A - North Duncan Canal**, by DGGS, Dighem, and WGM Staff, 1997, 1 sheet, 3 colors, scale 1:63,360. \$4.
- RI 97-16b. Total field magnetics and electromagnetic anomalies of the Stikine area, Southeast Alaska, Map B - South Duncan Canal**, by DGGS, Dighem, and WGM Staff, 1997, 1 sheet, 3 colors, scale 1:63,360. \$4.50.
- RI 97-16c. Total field magnetics and electromagnetic anomalies of the Stikine area, Southeast Alaska, Map C - Zarembo Island and eastern Prince of Wales Island**, by DGGS, Dighem, and WGM Staff, 1997, 1 sheet, 3 colors, scale 1:63,360. \$4.
- RI 97-16d. Total field magnetics and electromagnetic anomalies of the Stikine area, Southeast Alaska, Map D - Western Etolin Island**, by DGGS, Dighem, and WGM Staff, 1997, 1 sheet, 3 colors, scale 1:63,360. \$4.
- RI 97-16e. Total field magnetics and electromagnetic anomalies of the Stikine area, Southeast Alaska, Map E - Groundhog Basin**, by DGGS, Dighem, and WGM Staff, 1997, 1 sheet, 3 colors, scale 1:63,360. \$4.
- RI 97-17a. Total field magnetics of the Stikine area, Southeast Alaska, Map A - North Duncan Canal**, by DGGS, Dighem, and WGM Staff, 1997, 1 sheet, full color, scale 1:63,360. On-demand color plot from electronic file, 400 dpi. Made on request. \$13.
- RI 97-17b. Total field magnetics of the Stikine area, Southeast Alaska, Map B - South Duncan Canal**, by DGGS, Dighem, and WGM Staff, 1997, 1 sheet, full color, scale 1:63,360. On-demand color plot from electronic file, 400 dpi. Made on request. \$13.
- RI 97-17c. Total field magnetics of the Stikine area, Southeast Alaska, Map C -**

**Zarembo Island and eastern Prince of Wales Island**, by DGGs, Dighem, and WGM Staff, 1997, 1 sheet, full color, scale 1:63,360. On-demand color plot from electronic file, 400 dpi. Made on request. \$13.

**RI 97-17d. Total field magnetics of the Stikine area, Southeast Alaska, Map D - Western Etolin Island**, by DGGs, Dighem, and WGM Staff, 1997, 1 sheet, full color, scale 1:63,360. On-demand color plot from electronic file, 400 dpi. Made on request. \$13.

**RI 97-17e. Total field magnetics of the Stikine area, Southeast Alaska, Map E - Groundhog Basin**, by DGGs, Dighem, and WGM Staff, 1997, 1 sheet, full color, scale 1:63,360. On-demand color plot from electronic file, 400 dpi. Made on request. \$13.

**RI 97-18a. 900 Hz coplanar resistivity of the Stikine area, Southeast Alaska, Map A - North Duncan Canal**, by DGGs, Dighem, and WGM Staff, 1997, 1 sheet, full color, scale 1:63,360. On-demand color plot from electronic file, 400 dpi. Made on request. \$13.

**RI 97-18b. 900 Hz coplanar resistivity of the Stikine area, Southeast Alaska, Map B - South Duncan Canal**, by DGGs, Dighem, and WGM Staff, 1997, 1 sheet, full color, scale 1:63,360. On-demand color plot from electronic file, 400 dpi. Made on request. \$13.

**RI 97-18c. 900 Hz coplanar resistivity of the Stikine area, Southeast Alaska, Map C - Zarembo Island and eastern Prince of Wales Island**, by DGGs, Dighem, and WGM Staff, 1997, 1 sheet, full color, scale 1:63,360. On-demand color plot from electronic file, 400 dpi. Made on request. \$13.

**RI 97-18d. 900 Hz coplanar resistivity of the Stikine area, Southeast Alaska, Map D - Western Etolin Island**, by DGGs, Dighem, and WGM Staff, 1997, 1 sheet, full color, scale 1:63,360. On-demand color plot from electronic file, 400 dpi. Made on request. \$13.

**RI 97-18e. 900 Hz coplanar resistivity of the Stikine area, Southeast Alaska, Map E - Groundhog Basin**, by DGGs, Dighem, and WGM Staff, 1997, 1 sheet, full color, scale 1:63,360. On-demand color plot from electronic file, 400 dpi. Made on request. \$13.

**RI 97-19a. 7200 Hz coplanar resistivity of the Stikine area, Southeast Alaska, Map A - North Duncan Canal**, by DGGs, Dighem, and WGM Staff, 1997, 1 sheet, full color, scale 1:63,360. On-demand color plot from electronic file, 400 dpi. Made on request. \$13.

**RI 97-19b. 7200 Hz coplanar resistivity of the Stikine area, Southeast Alaska, Map B - South Duncan Canal**, by DGGs, Dighem, and WGM Staff, 1997, 1 sheet, full color, scale 1:63,360. On-demand color plot from electronic file, 400 dpi. Made on request. \$13.

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**RI 97-19e. 7200 Hz coplanar resistivity of the Stikine area, Southeast Alaska, Map E - Groundhog Basin**, by DGGs, Dighem, and WGM Staff, 1997, 1 sheet, full color, scale 1:63,360. On-demand color plot from electronic file, 400 dpi. Made on request. \$13.

#### Information Circulars

**IC 42. Alaska's mineral industry 1996: a summary**, by R.C. Swainbank, T.K. Bundtzen, A.H. Clough, and M.W. Henning, 1997, 12 p. Free.

**Special Reports**

- SR 51.** **Alaska's mineral industry 1996**, by R.C. Swainbank, T.K. Bundtzen, A.H. Clough, and M.W. Henning, 1997, 68 p. Free.

**Public-Data Files**

- PDF 97-1.** **Flight line maps of the Chulitna mining district, Alaska**, by DGGS, Dighem, and WGM, February 1997, 1 sheet, blue line, scale 1:63,360. \$4.50
- PDF 97-2.** **Clear mylar version of RI 97-1: Total field magnetics and electromagnetic anomalies of the Chulitna mining district, Alaska**, by DGGS, Dighem, and WGM, February 1997, 1 sheet, scale 1:63,360. Electromagnetic anomalies and magnetic contours 100% black; topography 50% black. . \$130.
- PDF 97-3.** **900 Hz resistivity contours of the Chulitna mining district, Alaska**, by DGGS, Dighem, and WGM, February 1997, 1 sheet, blue line, scale 1:63,360. \$4.50
- PDF 97-4.** **7200 Hz resistivity contours of the Chulitna mining district, Alaska**, by DGGS, Dighem, and WGM, February 1997, 1 sheet, blue line, scale 1:63,360. \$4.50
- PDF 97-5.** **CD-ROM digital archive files of 1996 survey data for Chulitna & Petersville mining districts, Alaska**, by DGGS, Dighem, and WGM, April 1997. \$150.
- PDF 97-6.** **Disk containing gridded files and section lines of 1996 geophysical survey data for Chulitna mining district, Alaska**, by DGGS, Dighem, and WGM, February 1997. \$10.
- PDF 97-7.** **Portfolio of aeromagnetic and resistivity maps of the Chulitna mining district**, by L.E. Burns, February 1997, 13 p. Includes color and shadow maps. Maps fit on 8½" x 11" sheet. \$6.
- PDF 97-8.** **Project report of the airborne geophysical survey for the Chulitna and Petersville mining districts, Alaska**, by Ruth Pritchard, May 1997, 293 p., 2 sheets, scale 1:63,360. \$41.30
- PDF 97-9.** **Flight line maps of the Petersville mining district, Alaska**, by DGGS, Dighem, and WGM, March 1997, 1 sheet, scale 1:63,360. \$5.50
- PDF 97-10.** **Clear mylar version of RI 97-5: Total field magnetics and electromagnetic anomalies of the Petersville mining district, Alaska**, by DGGS, Dighem, and WGM, March 1997, 1 sheet, scale 1:63,360. Electromagnetic anomalies and magnetic contours 100% black; topography 50% black. . \$165.
- PDF 97-11.** **900 Hz resistivity contours of the Petersville mining district, Alaska**, by DGGS, Dighem, and WGM, March 1997, 1 sheet, scale 1:63,360. \$5.50
- PDF 97-12.** **7200 Hz resistivity contours of the Petersville mining district, Alaska**, by DGGS, Dighem, and WGM, March 1997, 1 sheet, scale 1:63,360. \$5.50
- PDF 97-13a.** **Total field magnetics and detailed electromagnetic anomalies of the southwest Petersville mining district, Alaska**, by DGGS, Dighem, and WGM, April 1997, 1 sheet, scale 1:31,680. \$5.25.
- PDF 97-13b.** **Total field magnetics and detailed electromagnetic anomalies of the northeast Petersville mining district, Alaska**, by DGGS, Dighem, and WGM, April 1997, 1 sheet, scale 1:31,680. \$5.25.
- PDF 97-13c.** **Total field magnetics and detailed electromagnetic anomalies of the southeast Petersville mining district, Alaska**, by DGGS, Dighem, and WGM, April 1997, 1 sheet, scale 1:31,680. \$5.25.
- PDF 97-14.** **Disk containing gridded files and section lines of 1996 geophysical survey data for Petersville mining district, Alaska**, by DGGS, Dighem, and WGM, March 1997. \$10.
- PDF 97-15.** **Portfolio of aeromagnetic and resistivity maps of the Petersville mining district**, by L.E. Burns, March 1997, 13 p. Includes color and shadow maps. Maps fit on 8½" x 11" sheet. \$6.
- PDF 97-17.** **Extended flight line coverage of the Rampart-Manley mining district, Alaska**, by DGGS, Dighem, and WGM,

- March 1997, 3 sheets, scale 1:63,360. \$12.
- PDF 97-18.** Clear mylar version of RI 97-9: Extended coverage of the total field magnetics and electromagnetic anomalies of the Rampart-Manley mining district, Alaska, by DGGs, Dighem, and WGM, March 1997, 3 sheets, scale 1:63,360. Electromagnetic anomalies and magnetic contours 100% black; topography 50% black. . Sheet #1 - \$130.00, sheet #2 - \$130.00, sheet #3 - \$65.
- PDF 97-19.** Extended coverage of the 900 Hz resistivity contours of the Rampart-Manley mining district, Alaska, by DGGs, Dighem, and WGM, March 1997, 3 sheets, scale 1:63,360. \$12.
- PDF 97-20.** Extended coverage of the 7200 Hz resistivity contours of the Rampart-Manley mining district, Alaska, by DGGs, Dighem, and WGM, March 1997, 3 sheets, scale 1:63,360. \$12.
- PDF 97-21.** CD-ROM digital archive files of 1995 and 1996 survey data for Rampart-Manley mining district, Alaska, by DGGs, Dighem, and WGM, April 1997. \$150.
- PDF 97-22.** Disk containing gridded files and section lines of 1995 and 1996 geophysical survey data for Rampart-Manley mining district, Alaska, by DGGs, Dighem, and WGM, March 1997, 3 disks. \$15.
- PDF 97-23.** Portfolio of aeromagnetic and resistivity maps of the extended coverage of the Rampart-Manley mining districts, by L.E. Burns, March 1997, 13 p. Includes color and shadow maps. Maps fit on 8½" x 11" sheet. \$6.
- PDF 97-24.** Project report of the airborne geophysical survey for the extended coverage of the Rampart-Manley mining district, Alaska, by Ruth Pritchard, May 1997, 163 p., 3 sheets, scale 1:63,360. \$34.30.
- PDF 97-25g.** Extended coverage of the total field magnetics and detailed electromagnetic anomalies of the Rampart-Manley mining district, Alaska (Tanana A-2 and B-2 areas), by DGGs, Dighem, and WGM, April 1997, 1 sheet, scale 1:31,680. \$4.75.
- PDF 97-25h.** Extended coverage of the total field magnetics and detailed electromagnetic anomalies of the Rampart-Manley mining district, Alaska (Tanana B-1 area), by DGGs, Dighem, and WGM, April 1997, 1 sheet, scale 1:31,680. \$4.75.
- PDF 97-25j.** Extended coverage of the total field magnetics and detailed electromagnetic anomalies of the Rampart-Manley mining district, Alaska (Livengood B-6 area), by DGGs, Dighem, and WGM, April 1997, 1 sheet, scale 1:31,680. \$4.75.
- PDF 97-25k.** Extended coverage of the total field magnetics and detailed electromagnetic anomalies of the Rampart-Manley mining district, Alaska (Livengood B-5 area), by DGGs, Dighem, and WGM, April 1997, 1 sheet, scale 1:31,680. \$4.75.
- PDF 97-26a.** Total field magnetics and detailed electromagnetic anomalies of the northwest Chulitna mining district, Alaska, by DGGs, Dighem, and WGM, April 1997, 1 sheet, blue line, scale 1:31,680. \$5.25.
- PDF 97-26b.** Total field magnetics and detailed electromagnetic anomalies of the northeast Chulitna mining district, Alaska, by DGGs, Dighem, and WGM, April 1997, 1 sheet, blue line, scale 1:31,680. \$5.25.
- PDF 97-26c.** Total field magnetics and detailed electromagnetic anomalies of the southwest Chulitna mining district, Alaska, by DGGs, Dighem, and WGM, April 1997, 1 sheet, blue line, scale 1:31,680. \$5.25.
- PDF 97-26d.** Total field magnetics and detailed electromagnetic anomalies of the southeast Chulitna mining district, Alaska, by DGGs, Dighem, and WGM, April 1997, 1 sheet, blue line, scale 1:31,680. \$5.25.

- PDF 97-27. Total field magnetics of the southeastern Bethel basin, Alaska**, by Sander Geophysics Ltd. and DGGS, April 1997, 6 sheets, scale 1:125,000. \$20.
- PDF 97-28. Aeromagnetic survey of southeastern Bethel basin, Alaska**, by Stephan D. Sander, 32 p. \$6.
- PDF 97-29g. Rock geochemistry from the Rampart mining district**, by S.A. Liss, R.R. Reifensstuhl, K.H. Clautice, T.K. Bundtzen, R.J. Newberry, J.H. Dover, and R.B. Blodgett, February 1997, 19 p., 1 disk. \$7.
- PDF 97-29h. Geochronology ( $^{40}\text{Ar}/^{39}\text{Ar}$ ) of 17 Rampart-area rocks, Tanana and Livengood quadrangles, central Alaska**, by R.R. Reifensstuhl, P.W. Layer, and R.J. Newberry, February 1997, 22 p. \$2.20.
- PDF 97-29i. CIPW norm, trace element, and Sr isotopic data for igneous rocks of the Tanana B-1 Quadrangle and vicinity**, by R.J. Newberry and S.A. Haug, September 1997, 16 p. \$2.
- PDF 97-30. Hydrologic reconnaissance of the Sheenjek River Basin, Alaska**, by M.A. Maurer, February 1997, 16 p. \$2.
- PDF 97-31. Bedrock geologic map of the Kigluaik Mountains, Seward Peninsula, Alaska**, by J.M. Amato and E.L. Miller, March 1997, 6 p., 8 sheets, scale 1:42,240. \$25.
- PDF 97-32. Land status and mining claims for the Chulitna geophysical area, Alaska, version 1.1**, by DNR Land Records Information Section (LRIS), 1 sheet, scale 1:125,000. \$15.
- PDF 97-33. Land status and mining claims for the Petersville-Collinsville geophysical area, Alaska, version 1.1**, by DNR Land Records Information Section (LRIS), 1 sheet, scale 1:85,000. \$15.
- PDF 97-34. Land status and mining claims for the Rampart geophysical area, Alaska, version 1.1**, by DNR Land Records Information Section (LRIS), 1 sheet, scale 1:125,000. \$15.
- PDF 97-37a. Flight lines of the Stikine area, Southeast Alaska, Map A - North Duncan Canal**, by DGGS, Dighem, and WGM Staff, September 1997, 1 sheet, blueline, scale 1:63,360. \$4.
- PDF 97-37b. Flight lines of the Stikine area, Southeast Alaska, Map B - South Duncan Canal**, by DGGS, Dighem, and WGM Staff, September 1997, 1 sheet, blueline, scale 1:63,360. \$4.50.
- PDF 97-37c. Flight lines of the Stikine area, Southeast Alaska, Map C - Zarembo Island and eastern Prince of Wales Island**, by DGGS, Dighem, and WGM Staff, September 1997, 1 sheet, blueline, scale 1:63,360. \$4.
- PDF 97-37d. Flight lines of the Stikine area, Southeast Alaska, Map D - Western Etolin Island**, by DGGS, Dighem, and WGM Staff, September 1997, 1 sheet, blueline, scale 1:63,360. \$3.75.
- PDF 97-37e. Flight lines of the Stikine area, Southeast Alaska, Map E - Groundhog Basin**, by DGGS, Dighem, and WGM Staff, September 1997, 1 sheet, blueline, scale 1:63,360. \$4.
- PDF 97-38a. Clear film version of RI 97-16A. Total field magnetics and electromagnetic anomalies of the Stikine area, Southeast Alaska, Map A - North Duncan Canal**, by DGGS, Dighem, and WGM Staff, September 1997, Electromagnetic anomalies and magnetic contours 100% black; topography 50% black. 1 sheet, scale 1:63,360. Diazo film. Made on request. \$23.
- PDF 97-38b. Clear film version of RI 97-16B. Total field magnetics and electromagnetic anomalies of the Stikine area, Southeast Alaska, Map B - South Duncan Canal**, by DGGS, Dighem, and WGM Staff, September 1997, Electromagnetic anomalies and magnetic contours 100% black; topography 50% black. 1 sheet, scale 1:63,360. Diazo film. Made on request. \$31.



- PDF 97-38c. Clear film version of RI 97-16C. Total field magnetics and electromagnetic anomalies of the Stikine area, Southeast Alaska, Map C - Zarembo Island and eastern Prince of Wales Island, by DGGS, Dighem, and WGM Staff, September 1997, Electromagnetic anomalies and magnetic contours 100% black; topography 50% black. 1 sheet, scale 1:63,360. Diazo film. Made on request. \$23.**
- PDF 97-38d. Clear film version of RI 97-16D. Total field magnetics and electromagnetic anomalies of the Stikine area, Southeast Alaska, Map D - Western Etolin Island, by DGGS, Dighem, and WGM Staff, September 1997, Electromagnetic anomalies and magnetic contours 100% black; topography 50% black. 1 sheet, scale 1:63,360. Diazo film. Made on request. \$18.**
- PDF 97-38e. Clear film version of RI 97-16E. Total field magnetics and electromagnetic anomalies of the Stikine area, Southeast Alaska, Map E - Groundhog Basin, by DGGS, Dighem, and WGM Staff, September 1997, Electromagnetic anomalies and magnetic contours 100% black; topography 50% black. 1 sheet, scale 1:63,360. Diazo film. Made on request. \$23.**
- PDF 97-39a. 900 Hz coplanar resistivity of the Stikine area, Southeast Alaska, Map A - North Duncan Canal, by DGGS, Dighem, and WGM Staff, September 1997, 1 sheet, blueline, scale 1:63,360. \$4.**
- PDF 97-39b. 900 Hz coplanar resistivity of the Stikine area, Southeast Alaska, Map B - South Duncan Canal, by DGGS, Dighem, and WGM Staff, September 1997, 1 sheet, blueline, scale 1:63,360. \$4.50.**
- PDF 97-39c. 900 Hz coplanar resistivity of the Stikine area, Southeast Alaska, Map C - Zarembo Island and eastern Prince of Wales Island, by DGGS, Dighem, and WGM Staff, September 1997, 1 sheet, blueline, scale 1:63,360. \$4.**
- PDF 97-39d. 900 Hz coplanar resistivity of the Stikine area, Southeast Alaska, Map D - Western Etolin Island, by DGGS, Dighem, and WGM Staff, September 1997, 1 sheet, blueline, scale 1:63,360. \$3.75.**
- PDF 97-39e. 900 Hz coplanar resistivity of the Stikine area, Southeast Alaska, Map E - Groundhog Basin, by DGGS, Dighem, and WGM Staff, September 1997, 1 sheet, blueline, scale 1:63,360. \$4.**
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- PDF 97-40b. 7200 Hz coplanar resistivity of the Stikine area, Southeast Alaska, Map B - South Duncan Canal, by DGGS, Dighem, and WGM Staff, September 1997, 1 sheet, blueline, scale 1:63,360. \$4.50.**
- PDF 97-40c. 7200 Hz coplanar resistivity of the Stikine area, Southeast Alaska, Map C - Zarembo Island and eastern Prince of Wales Island, by DGGS, Dighem, and WGM Staff, September 1997, 1 sheet, blueline, scale 1:63,360. \$4.**
- PDF 97-40d. 7200 Hz coplanar resistivity of the Stikine area, Southeast Alaska, Map D - Western Etolin Island, by DGGS, Dighem, and WGM Staff, September 1997, 1 sheet, blueline, scale 1:63,360. \$3.75.**
- PDF 97-40e. 7200 Hz coplanar resistivity of the Stikine area, Southeast Alaska, Map E - Groundhog Basin, by DGGS, Dighem, and WGM Staff, September 1997, 1 sheet, blueline, scale 1:63,360. \$4.**
- PDF 97-41. CD-ROM digital archive file of 1997 survey data for Stikine area, South-**

east Alaska, by DGGS, Dighem, and WGM Staff, September 1997. \$150.

**PDF 97-42. Disks containing gridded files and section lines of 1997 geophysical survey data for Stikine area, Southeast Alaska,** by DGGS, Dighem, and WGM Staff, September 1997. Price to be determined.

**PDF 97-43. Portfolio of aeromagnetic and resistivity maps of the Stikine area, Southeast Alaska,** by Burns, L.E., September 1997. Includes color and shadow maps. Maps fit on 8 1/2" x 11" sheet. Price to be determined.

**PDF 97-44. Project report of the airborne geophysical survey for Stikine area, Southeast Alaska,** by Ruth Pritchard, September 1997. Price to be determined.

**PDF 97-45a-k. Total field magnetics and detailed electromagnetic anomalies of the Stikine area, Southeast Alaska,** by DGGS, Dighem, and WGM Staff, September 1997, 11 sheets, blue line, scale 1:31,680. Sheets sold individually. \$4.25/sheet.

**PDF 97-46. Preliminary geologic map and data table from the Ophir C-1 and western Medfra C-6 Quadrangles, Alaska,** by Thomas K. Bundtzen, DeAnne S. Pinney, and Gregory M. Laird, July 1997, 11 p., 1 sheet, scale 1:63,360. \$7.

**PDF 97-47. Hydrologic and water quality study of Hoseanna Creek basin near Healy, Alaska: 1995-1996 progress report,** by Jim Vohden, June 1997, 34 p. \$3.40.

**PDF 97-49. Compositions of placer gold in the Rampart-Eureka-Manley Tofty area, eastern Tanana and western Livengood Quadrangles, central interior Alaska, Determined by electron microprobe analysis,** by R.J. Newberry and K.H. Clautice, September 1997, 49 p. \$4.90.

**PDF 97-51. Water-quality data for Potter Marsh, Anchorage, Alaska,** by M.A. Maurer, October 1997, 12 p. \$2.

## PROGRAM DEVELOPMENT

DGGS develops its strategic programs and project arrays through consultation with the many users of geological information—state and federal agencies, the federal congressional delegation, the state Legislature, the private sector, academia, and myriad Alaska citizens. Their input to DGGS programs comes through the Alaska Geologic Mapping Advisory Board (see page 6), the liaison activities of the Director, and personal contact between DGGS staff and the above groups.

## FY99 DGGS PROGRAM FOR ALASKA

The FY99 DGGS program is focused primarily on projects designed to foster the creation of future Alaskan jobs and revenue. To maintain general prosperity, Alaska must foster major capital investment for job creation in the state. In the near future, much of the Alaska economy will continue to depend on developing the state's natural resources. Within that future, subsurface energy and mineral resources constitute the major portion of the state's wealth. DGGS provides much of the initial geologic data needed to catalyze and guide in-state geologic resource exploration and development ventures and provides a geologic framework for infrastructure development.

The Division of Geological & Geophysical Surveys has a strategic role in revenue generation and maintenance of Alaska's economy. DGGS provides objective geologic data and information used by in-state, national, and international mineral, energy, construction companies, and air carriers; other DNR agencies, Department of Law, Department of Commerce and Economic Development, Department of Transportation, Department of Community and Regional Affairs, Division of Emergency Services, and the Federal Emergency Management Agency. DGGS geologists assist prospectors, mineral, oil, and gas explorationists, and others to explore for, discover, and develop Alaska's subsurface resources. DGGS is a central repository of Alaska geologic information and a primary source of information for mitigating geologic hazards (volcanic hazards, coastal erosion, and earthquake hazards). To focus attention on Alaska's subsurface resource potential, DGGS makes the state's geologic information available on statewide, national, and international levels.



PROJECT	GOAL	FUNDING
<b>Statewide Mineral Resource Appraisal</b>		615.9
The Statewide Mineral Resource Appraisal project generates new geological and geophysical data useful for locating mineral deposits on state lands. This information commonly catalyzes significant private-sector investment leading to the creation of new jobs and the development of Alaska's mineral resources. Work is focused in accessible mining districts throughout Alaska.	Create new employment opportunities and foster the development of a more diversified state economy.	
<b>Energy Resource Appraisal</b>		468.3
The Energy Resource Appraisal project generates new geologic data useful for locating oil, gas, coal, or geothermal resources. Project work is regional and strategic in nature. It is designed to identify and provide an understanding of the geologic framework and potential energy producing geologic environments within Alaska.	Catalyze private-sector investment in revenue producing oil production and to locate energy resources useful for local heat and power generation in rural Alaska.	
<b>Geologic Materials Center</b>		76.3
The Geologic Materials Center (GMC), located in Eagle River, houses the state's only centralized repository of publicly available sample materials from Alaska's oil wells and mineral deposits. These samples are used by the geoscience public to generate and test new concepts that form the basis for full-scale oil, gas, or mineral exploration projects designed to find new deposits. The continued availability and use of these samples increases the private-sector's efficiency and probability of success in locating and developing Alaska's geologic resources.	Increase the efficiency and success ratio of private-sector projects aimed at developing Alaska's energy and mineral resources so that new jobs and revenues are created.	
<b>Statewide Engineering Geology</b>		240.4
The Statewide Engineering Geology project focuses on generating data that are used to guide the engineering design of roads, railroads, bridges and other state infrastructure, and to assess potential geologic hazards whose effects can be mitigated through proper forward planning and engineering design.	Reduce personal and financial losses that can result from future natural geologic hazards events.	
<b>Construction Materials Resources</b>		136.1
The Construction Materials Resources project generates new data on the location and general characteristics of the state's construction materials.	Identify sources of sand, gravel, rip-rap, and other construction and industrial-mineral resources needed to support Alaska's economic growth and infrastructure development.	

PROJECT	GOAL	FUNDING
<b>Geologic Maps and Reports</b>		182.3
The Geologic Maps and Reports project funds the compilation and summation of data and information generated within the division's technical projects and preserves it as unbiased peer-reviewed maps, reports, and computer-based databases.	Catalyze the implementation of Alaska enterprises by providing useful geologic information to all Alaskans in appropriate and efficient formats.	
<b>Director/State Geologist</b>		0.00
The Director provides leadership and coordination for the activities of the division. Funding for the Director's Office was deleted by the Legislature in FY96. Currently, the duties of the Division Director are being funded by assessing each of the division's formal projects.	Provide strategic leadership for the Geological Development Component of DNR and act as liaison between the division and the DNR Commissioner's Office, other state agencies, and local, federal and private entities to meet the geologic information needs of the public and state government.	
<b>Technical Support Services</b>		200.8
The Technical Support Services project provides financial control and technical support for all other division projects.	Optimize implementation of the division's geologic resource and geologic hazards mitigation programs.	
<b>Priority Mineral and Energy Resource Development</b>		49.8
This project utilizes mathematical and computer-based geological data modeling techniques to identify high-priority mineral and energy tracts on Alaska state lands as a catalyst to private-sector exploration and development.	Create new high-quality jobs in Alaska and aid in diversifying the economy of the state.	
<b>Federal Receipts Project</b>		355.5
This project provides authorization to receive and expend funds acquired from federal grants and contracts.	Acquire federal funds to support long-term state geologic-resource inventory and geologic hazard mitigation objectives.	
<b>Inter-Agency Receipts</b>		101.3
This project provides authority to receive and expend funds acquired from other state agencies.	Provide a mechanism to support DGGs participation in multi-agency projects in pursuit of state goals.	

PROJECT	GOAL	FUNDING
<b>Program Receipts</b>		<b>54.9</b>
This project provides authorization to receive and expend funds acquired through gifts, grants, or reimbursement from the private sector.	Provide a mechanism to receive funds from the private sector to partially defray the costs of publishing DGGs maps and reports, or conduct investigations of particular interest to a group of sponsors.	
<b>Direct Charge CIP</b>		<b>98.3</b>
The Direct Charge CIP project contains the personal services funds necessary to implement the division's short-term CIP projects	Ensure that DGGs expeditiously implements the state's high-priority minerals and energy Capital Improvement Projects that help create new jobs in the private sector, diversify the state's economy, and decrease cost of energy in rural Alaska.	

## FY99 PROJECT DETAIL

### DIRECTOR/STATE GEOLOGIST

The Director's office provides leadership and coordination for the activities of the division through the State Geologist/Director and Secretary. Funding for the Director's office was deleted by the Legislature in the FY96 General Fund budget. Currently, the duties of the Division Director are funded from annual assessments levied on all DGGs technical projects.

### Performance Objectives

1. Provide executive leadership for the Geological Development Component and act as liaison between the Division and the DNR Commissioner's Office, other State agencies, and local, federal, and private entities.
2. Stimulate discovery and development of the geologic resources of the state through support of detailed geologic and geophysical surveys.
3. Mitigate the adverse effects associated with natural geologic hazards.
4. Provide secure archival storage and access to the state's growing legacy of oil- and minerals-related geologic reference cores, samples, and other geologic resource related data.

### Economic Returns

The Director's Office activities are critical to running an efficient geological development program focused on state needs. Through his/her leadership, the State Geologist encourages the DGGs staff and cooperating federal, local, and private agencies to investigate and develop geologic programs to increase the amount of state land geologically investigated and mapped at scales useful for geological resource exploration, development, and management.



**STATEWIDE MINERAL APPRAISAL PROJECT**

The decline of oil-generated revenues suggests that Alaska must move decisively to strengthen its subsurface resources economic base. To achieve this goal, Alaska needs private sector commitment of capital and talent in non oil-related as well as oil-related industries. The mineral industry, however, will not commit major company resources or succeed on an acceptable timeline without dramatic advances in understanding the geologic environments of the most prospective Alaska lands open to mineral and other geologic resource development. Alaska has an accessible state land endowment of more than 100 million acres, much of it chosen from a 350 million acre land pool because of perceived potential to host mineral wealth. Currently the overwhelming majority of these lands are not geologically or geophysically surveyed at the detailed level or with the focus needed to optimize mineral discovery and development. Recently, a DNR/DGGS program of integrated geological and geophysical mapping has been effective in attracting new private-sector mineral investment capital to Alaska. The purpose of the FY99 Statewide Mineral Resource Appraisal Project is to produce, on a prioritized schedule, the critical new geological surveys needed to sustain Alaska's mineral industry investments and provide management agencies with information needed to formulate rational management policy.

The Statewide Mineral Appraisal Project also participates in the division-wide task of implementing a comprehensive on-line computerized geologic reference database of Alaska for the public.

Implementation of the numerous elements of the Statewide Mineral Resource Appraisal Project are financed from a mixture of funding sources: General Fund operating moneys, Capital Improvement Projects funding, Federal Receipts, and Program Receipts.

**Objectives**

1. Catalyze increased mineral resource exploration in six mining districts within the next three years.
2. Provide DNR, other state agencies, and the public with unbiased authoritative information on the mineral resources of the state so that rational land policy and investment decisions can be made.
3. Provide an accurate current statistical and descriptive summary of the status of Alaska's mineral industry for the period of calendar year 1997.

**Performance Measures**

Project tasks and products financed by FY99 General Funds, state CIP funds, Program Receipt funds, and Federal Receipt funds:

1. Publish the final comprehensive bedrock geologic maps and ground-truth geologic data from the Tanana A-1, A-2 quadrangles in the Manley-Rampart-Tofty district from field generated ground-truth data collected in FY97 and early FY98. These data will be released in a summary report as part of a series of 1:63,360-scale bedrock- and surficial-geologic maps, generalized derivative 1:63,360 engineering-geologic maps, and a mineral-occurrence map.
2. Complete follow-up ground-truth bedrock geologic field observations in the upper Chulitna mining district and compilation of a final comprehensive bedrock geologic map from data gathered during the summers of 1997 and 1998. These data will be released as a summary report and as part of a series of 1:63,360-scale bedrock, surficial, and derivative engineering-geologic maps.
3. Complete the first year of a two-year project to conduct geologic ground-truth surveys of the Petersville-Collinsville mining districts, and publication of the data collected as interim surficial-geologic and derivative engineering-geologic maps at a scale of 1:63,360.
4. Compile and publish comprehensive geological survey data for bedrock and surficial geological units in the Ruby mining district contributed by private sources. These data will be released as a final geological map at 1:63,360 scale.

5. Initiate an Alaska-Yukon cooperative geologic and mineral inventory information exchange for selected high resource potential portions of the Yukon-Tanana Uplands.
6. Continue computerized georeferencing of all existing DGGs publications in an Internet accessible database so that anyone in Alaska can determine what state-generated geologic data is available for any part of the state.
7. Prepare and publish DGGs's annual report on mineral industry activity in Alaska, *Alaska's Mineral Industry*.

#### STATEWIDE ENERGY RESOURCE ASSESSMENT PROJECT

The Statewide Energy Resource Assessment project produces new geologic information about the state's oil, gas, and coal resources. Currently, oil-generated revenue, while still the largest contributor to the state's economy, is declining. This project, therefore, focuses significant effort on geologic studies to identify new areas capable of hosting major oil and gas discoveries. Recently, DGGs work has been directed towards the largely unexplored western North Slope Basin. A better understanding of the oil-related geologic parameters in this potentially major oil province is critical to the state's desire to maintain a strong in-state oil industry. The quality and extent of publicly available geologic mapping for this region, however, is not currently adequate to delineate good prospective areas much beyond the vicinity of Prudhoe Bay or the northeastern corner of the National Petroleum Reserve-Alaska (NPRA). New information is especially important to attract new major exploration investments to the state.

The cost of heating and power generation in rural Alaska also has been a perennial concern that is growing more acute as revenues from the oil industry decline. The impact of power generation costs on the state's annual budget can be decreased if economically viable local sources of alternative energy can be located near rural villages and towns. In FY99, DGGs will continue to address a solution to this problem through its Statewide Energy Resource Assessment Project. FY99 work will concentrate on evaluating specific sites within one to three interior basins of Alaska with respect to the possibility of locating natural gas or coalbed methane energy sources for local consumption and on assessing the oil and gas potential of the Western Arctic Plain of Alaska. In addition, DGGs also will compile and summarize (at 1:63,360 scale) data generated from previous field investigations conducted in the DeLong Mountains and Misheguk Mountains quadrangles of northwestern Alaska.

A second rural energy project is focused on the Holitna Basin in southwestern Alaska. The Holitna Basin is a small, approximately 3,000 square mile, lowland basin with a long narrow trough that may be filled with as much as 14,000 feet of Tertiary sedimentary rock. Preliminary indications are that this trough has had a thermal history that could have been favorable to the generation and preservation of gas or oil. At present, the general geologic framework, details about potential source rocks, reservoirs, and traps are not defined well enough to guide more advanced stages of oil or gas exploration. Any local source of natural gas, however, would benefit rural towns within the vicinity of the Holitna Basin.

The Statewide Energy Resource Assessment Project also participates in the division-wide task of implementing a comprehensive on-line computerized geologic reference database of Alaska for the public.

The numerous elements of the Statewide Energy Resource Assessment Project are financed from a mixture of funding sources: General Fund, Program Receipts, Federal Receipts, and Capital Improvements Projects funding.

#### Objectives

1. Catalyze active private sector exploration of the Western Arctic oil province within the next two years.
2. Investigate the feasibility of lowering the cost of heat and power generation in rural Alaska by defining drilling targets for at least one potential coalbed methane source area for local-market commercial production.

3. Provide DNR, other state agencies, and the public with authoritative information relating to the energy resources of the state so that rational policy and investment decisions can be made.

#### Performance Measures

Project tasks and products financed by the General Fund operating budget, Program Receipts, and Federal Receipts in FY99 are:

1. Produce a detailed stratigraphic section and geochemical profile of the Jurassic to Lower Cretaceous section of the Western Arctic Slope to identify oil source rocks.
2. Produce 1:63,360-scale geologic maps of the Thesis Creek–Ipewik River area and the Kokolik–Utukok River area to help delineate oil source and reservoir rock distributions in the Western Arctic Slope.
3. Define at least one exploratory well site to test the coalbed-methane potential and economic feasibility of a site in the vicinity of a rural Alaska village.
4. Compile data on Alaska's coal fields and basins on a CD-ROM so that the data can be more widely distributed and made easier to use.
5. Assemble and synthesize new and historical data on the geology and gas potential of the Holitna Basin.
6. Compile energy-related references for the Division's state-federal cooperative Internet-based georeferenced Alaska geologic database.

#### GEOLOGIC MATERIALS CENTER PROJECT

The Geologic Materials Center (GMC) archives and provides public access to non-proprietary oil and gas drill cores and drill-cutting samples, rock cores from mineral properties, and processed ore, oil, gas, and coal host- and source-rock samples. These samples are used by government and private-sector geoscientists to improve the odds of finding new oil, gas, and mineral deposits that will maintain the flow of state revenues and provide in-state employment. The Geologic Materials Center Project is financed from the General Fund budget and approximately \$150,000 of in-kind contributions directly from industry. The private sector contributes the cost of delivering all new samples, sample preparation and analyses, sample logs, and data logs.

The holdings of the GMC are a continually growing asset that is compounding in value over time at little cost to the state. The GMC facility is staffed by one division geologist and numerous private-sector volunteers. The GMC has formal cooperative agreements with the U.S. Geological Survey, the U.S. Minerals Management Service and U.S. Bureau of Land Management to house and control their Alaska geologic materials. There is a voluntary 14-member Board that advises the GMC project leader and DGGs on matters pertaining to the GMC.

#### Objectives

1. Enhance oil revenues and in-state employment opportunities by making oil, gas, and mineral exploration more effective.
2. Advance the knowledge of the geology and resources in Alaska's low-lying structural basins favorable for oil discovery and various kinds of mineral deposits in Alaska's highlands favorable for minerals.

#### Performance Measures

Project tasks and products funded by the General Fund operating budget in FY99:

1. Receive, archive and maintain cores, cuttings, and processed samples within a system that provides ready access to the general public, government, and industry while preserving the long-term integrity of the sample and core collection.
2. Make the recently received Shell Oil Company and Marathon Oil Company sample collections available to the public. These two collections comprise over 150 tons of well core material.

## STATEWIDE ENGINEERING GEOLOGY PROJECT

The Statewide Engineering Geology Project addresses major engineering-geology and geologic-hazards issues that affect public safety and economic well being in developing areas of Alaska. DGGs conducts engineering geologic mapping showing distribution and character of surficial deposits, their suitability for foundations, susceptibility to erosion, earthquakes and landslides, and other geologic hazards. Geologic evaluations of areas subject to major hazards like floods, earthquakes, volcanic eruptions, and landslides help predict the likelihood of future major events, the severity of hazards associated with them, and suggests alternatives to avoid or reduce the effect of these hazards. In addition to General Funds, several elements of the Statewide Engineering Geology Project are partially or largely financed from Federal Receipts or Program Receipts.

### Objectives

1. Protect health and public safety by providing information on geologic hazards as they affect human activity.
2. Lower the costs of construction design and improve prior planning to mitigate consequences arising from natural geologic hazardous events and conditions.
3. Provide reliable engineering-geologic data for informed natural hazards assessment and land-use decisions by the government and private sector.

### Performance Measures

Project tasks and products funded by General Fund, Federal Receipts, or Program Receipts moneys in FY99 are:

1. Produce written evaluations of potential hazards in areas of oil exploration leases, land disposals, permit applications, etc. (estimated 20–30 formal responses).
2. Conduct post-event hazard evaluations in response to unexpected major geologic events (e.g., evaluation of post-earthquake ground failure and landslide potential or post volcanic eruption flood and debris-flow potential).
3. Publish a CD-ROM-based and Internet-accessible georeferenced database on the subsurface geology and engineering properties of urban areas of Alaska, beginning with Anchorage in FY99.
4. Complete the first six months (through June 1999) of a 12-month project to develop engineering-geologic and earthquake-hazard maps of Anchorage, based on the georeferenced database in item 3.
5. Implement a cooperative program with the University of Alaska School of Mineral Engineering to establish a GIS database of mineral and construction material resources in the coastal areas of Alaska.
6. Produce a volcanic hazards map of Shishaldin volcano in cooperation with the other interagency members of the Alaska Volcano Observatory (AVO).
7. Coordinate the federally-funded upgrading of existing volcano monitoring instrumentation and the installation of new instrumentation at two additional volcanoes in the Central Aleutian Islands in cooperation with the other interagency members of the Alaska Volcano Observatory (AVO).
8. Develop Internet-accessible, map-based, georeferenced database for the Alaska Volcano Observatory.

## CONSTRUCTION MATERIALS RESOURCES PROJECT

The Construction Materials project provides information on the rip-rap, sand, and gravel construction materials needed for private and public infrastructure construction. The information provided by this project expedites the design and planning phases of state and private construction projects and helps control the cost of those projects for which this information is available. Sources of construction materials are of special concern in much of rural Alaska where coarse rip-rap is needed for erosion control near towns and villages, and gravel is needed for local and regional roads. During FY99, this project will focus on mapping materials resources in areas of south-central Alaska, previously selected for geophysical mapping, to support the expansion of the state's mineral industry.

Implementation of the FY99 Statewide Construction Materials project outlined below is supported by General Fund, Federal Receipts, and Program Receipts moneys.

#### **Objectives**

1. Identify sources of sand, gravel, rip-rap, stone, and other geologic construction materials required to create the infrastructure, roads, and other land-based transportation corridor improvements necessary to support expanded development of natural resources and other local economic activities, such as tourism in the State of Alaska.

#### **Performance Measures**

Project tasks and products financed by the General Fund, Federal Receipts, and Program Receipts moneys in FY99 are:

1. Publish final comprehensive surficial geologic maps and ground-truth data from the Tanana A-1 and A-2 quadrangles in the Manley-Tofty mining district generated in FY98. These data will be released as part of a summary report in a series of 1:63,360-scale surficial-geologic and derivative engineering-geologic maps summarizing the location of potential construction materials.
2. Complete the first year of a two-year project to conduct geologic ground-truth surveys of the Petersville-Collinsville mining districts, and publication of the data collected as interim surficial-geologic and derivative engineering-geologic maps at a scale of 1:63,360.
3. Complete follow-up ground-truth geologic field observations in the upper Chulitna mining district and compilation of final comprehensive surficial geology maps from data gathered during 1997 and 1998. These data will be released as part of a summary report in a series of 1:63,360-scale surficial-geologic and derivative engineering-geologic maps summarizing the location of potential construction materials.

#### **GEOLOGIC MAPS AND REPORTS PROJECT**

The Geologic Maps and Reports Project edits, publishes, and disseminates technical and summary reports and maps on Alaska's geologic resources that are generated by the Division's technical projects. The maps and reports released through this project are the primary vehicle the state has for widely disseminating factual information and data relating to its subsurface mineral and energy wealth, its geologic construction materials, and its engineering geology. These documents focus attention on Alaska's most geologically prospective and useful lands and are the authoritative basis for many of the state's resource-related land policy decisions. They also stimulate geologic exploration investment leading to resource discoveries and subsequent major capital investments. Timely availability of information derived from DGGS geological surveys is a significant factor in creating a more sustainable economy to offset the decline in Prudhoe Bay oil production.

This project began extensive use of the Internet in FY98 to enhance the timely disbursement of the Division's information and to provide state and worldwide access to the Division's geologic information base. The Geologic Maps and Reports Project is financed through the General Fund, Federal Receipts, and Program Receipts.

#### **Objectives**

1. Disseminate new, accurate, unbiased, division-generated data on the geology of Alaska to the public at large, to interested DNR policy and regulatory groups and to all other interested parties within one year of its acquisition.
2. Preserve the data and knowledge generated by the division's special and ongoing projects in an organized, readily retrievable, and reproducible form consistent with pertinent professional standards.
3. Focus public awareness on Alaska's most prospective mineral and energy lands.

**Performance Measures**

Project tasks and products funded by General Fund and Program Receipt moneys are:

1. Publish and distribute an annual report on Alaska's mineral industry.
2. Publish five new digital maps of the geology and natural resources of selected areas within the State of Alaska.
3. Distribute 12,000 or more copies of new or previously published maps and publications.
4. Distribute new, accurate, unbiased information on the geology and natural resources of the State of Alaska within one year of data acquisition.
5. In cooperation with federal agencies, post comprehensive database of Alaskan geology on the Internet within two years.
6. Post digital maps and publications produced by DGGS on the Internet within one year of their production.
7. Provide digital "value-added" geologic data products as requested.
8. Publish a triannual newsletter of the Alaska Division of Geological & Geophysical Surveys to keep the public informed about DGGS projects and products.
9. Create an archival record documenting the factual database and procedure for reproducing each digital map published.

**TECHNICAL SUPPORT PROJECT**

This project provides financial control and technical support for all other projects in the Geological Development component including: securing lowest costs for goods and services; maintaining, and when necessary, procuring vehicles for field work; coordinating travel arrangements and appropriate paperwork to minimize travel expenses and field party subsistence costs; negotiating the helicopter contract; administering and monitoring grants and contracts; tracking and reporting project expenditures to ensure cost containment within budget for all projects; mail/courier services; assistance in personnel matters; petty cash; receptionist support; coordination of public inquiries for maps, reports, and other information; computer assistance; and any other support necessary to further increased efficiency or savings in acquiring knowledge of the geology of Alaska.

**Objectives**

1. Monitor grants and contracts (Federal, Interagency, and Program Receipts) to ensure deliverables are produced on schedule and within budget; ensure expenses are properly billed against grants and contracts and receipts are collected promptly.
2. Provide accurate, timely reporting of project expenditures and current balances; encourage prudent money management.
3. Coordinate and direct public inquiries. Put geologic information in the hands of exploration companies and other resource developers and investors.
4. Decrease the cost of transportation to the field by coordinating personnel travel and supply shipments; negotiate long-term helicopter contracts in cases where helicopters are necessary; coordinate division vehicle use and decrease requests for reimbursement for personal vehicle mileage.
5. Make travel arrangements and complete travel authorizations to ensure use of the lowest cost travel options.
6. Provide communication between remote field camps and office, allowing for unforeseen circumstances, expediting field supplies, and personnel safety.
7. Expedite mail/courier service to send geologic samples to various laboratories for special analysis, to send and receive correspondence related to geologic projects.
8. Assist staff with personnel matters; file paperwork to hire, terminate, reprimand, commend, or lay off personnel as necessary to fulfill the mission of the division; keep staff informed about changes in personnel rules or



benefits and ensure that all personnel paperwork complies with applicable rules and regulations. Project personnel salaries and benefits to assist management in making human resource decisions necessary to efficiently produce the greatest amount of resource information.

9. Maintain a petty cash fund to allow staff to use most expedient means to purchase the tools they need to produce a useful product in a timely manner.

#### **Performance Measures**

1. Number of field vehicles available; decreased number of requests for personal vehicle reimbursement.
2. No travel rule violations; travel paperwork filed in timely manner.
3. Helicopter contracts in place before field season; more samples collected; more accurate maps produced; lower seasonal cost.
4. Contract deliverables produced on schedule, within budget; expenses properly billed; receipts collected promptly. New cooperative agreements offered and accepted.
5. Project chiefs know account balances at all times; no accounts overspent.
6. Personnel matters including hire, termination, reprimand, commendation, or layoff paperwork filed accurately and on time.
7. Telephone calls answered and responses made regarding geologic resource information.

#### **PRIORITY MINERAL AND ENERGY RESOURCE DEVELOPMENT PROJECT**

The Priority Mineral and Energy Resource Development Project aids in the identification of mineral, energy, or construction material resources statewide on a priority basis. In FY99, DGGS will continue addressing the high priority that the Department of Natural Resources and Alaska citizens place on decreasing the time and expense of assembling geologic data pertinent to the location of valuable geologic resources. The division is continuing the development of a computerized on-line, georeferenced geologic database for the State of Alaska. This project is designed to bring one or more complete subsets of geologic data or reference information into the database each year until the project is complete. Because of the magnitude of this task, and limited resources, the project was originally planned for five years. However, through a series of formal and informal cooperative agreements with other resource agencies, we now hope to have this project completed within the next two years. Useable products will be produced each year of the project.

#### **Objectives**

1. Decrease the time needed for assembling publicly available references to geoscientific data pertinent to virtually any geologically-related issue in Alaska to no more than one hour by the year 2000.

#### **Performance Measures**

Project tasks and products financed by the General Fund operating budget in FY99 are:

1. In cooperation with the federal U.S. Geological Survey, integrate georeferenced USGS report and map citations with those of DGGS and the U.S. Bureau of Land Management that have now been put on the Internet.
2. Contingent upon federal receipts, make the Division's Geologic Materials Center archival database available on the Internet.

#### **FEDERAL RECEIPTS PROJECT**

The Federal Receipts Project allocates funds received from federal agencies for cooperative or matching fund projects such as investigations of mineral and materials resources, energy resource investigations, and geologic hazard assessments. All these projects increase information on Alaska's geologic resource base or the geologic

engineering parameters of natural conditions affecting development activities and public safety. Most projects are unique single- or multi-year projects that are implemented as funds are available from cooperating federal agencies.

### Objectives

1. Maximize the return on Alaska General Fund moneys expended to meet the mandate of AS 41.08.020 through federal grant and cooperative project funding support of Alaska's geologic survey priorities.
2. Conduct geological and geophysical surveys to determine the potential of Alaskan land for the production of metals, minerals, and fuels.
3. Determine the potential geologic hazards to buildings, roads, bridges, and commerce from earthquakes and volcanic eruptions.
4. Conduct other surveys and investigations that will advance the knowledge of the geology of Alaska.

### Performance Measures

Project tasks financed in part by Federal Receipt funds in FY99 are:

1. Bedrock and surficial geologic maps of the Upper Chulitna mining district (implemented as elements within the Statewide Mineral Appraisal and Statewide Construction Materials Projects).
2. Small coal field and interior basin coal resource database (implemented within the Statewide Energy Resource Assessment Project).
3. Alaska Volcano Observatory supported geologic hazards maps of Mt. Spurr and Shishaldin (implemented as an element within the Statewide Engineering Geology Project).
4. Alaska Volcano Observatory supported upgrade and deployment of new volcano monitoring instrumentation on two Alaska volcanoes (implemented as an element within the Statewide Engineering Geology Project).
5. Extension of the Anchorage borehole geotechnical database and subsurface modeling and initiation of liquefaction susceptibility and seismic soil-type maps (implemented within the Statewide Engineering Geology Project).
6. Complete the digital conversion of the Killik River Quadrangle 1:250,000-scale geologic map (implemented within the Statewide Energy Resource Assessment Project).

### INTERAGENCY RECEIPTS PROJECT

This project allocates funds received from other State agencies for cooperative projects such as investigations of mineral and materials resources, energy-resource investigations, and geologic hazard assessments. All of these projects increase information on Alaska's geologic resource base, and/or the geologic engineering parameters of natural conditions affecting development activities. Most projects are one-time single- or multi-year projects that are awarded as information or studies are needed from cooperating State agencies. We do not normally know in advance which projects, if any, will be funded during the forthcoming budget year. Historically, however, the level of interagency receipts authorization requested here will cover cooperative projects.

### PROGRAM RECEIPTS PROJECT

This project allocates funds received from local governments, private industry, and the general public from sale of publications, cooperative or matching fund projects such as investigations of mineral and materials resources, energy resource investigations, and geologic hazard assessments. All of these projects

increase information on Alaska's geologic resource base, or the geologic engineering parameters of natural conditions affecting development activities. Most elements are one-time single- or multi-year tasks that are undertaken as funds are available from cooperating agencies. We do not normally know in advance which projects, if any, will be funded during the forthcoming budget year.

### **Objectives**

1. Maximize results from Alaska General Fund and CIP moneys through non-governmental program receipts to meet the mandate of Alaska Statute AS 41.08.020.
2. Provide for the timely release of mineral-, energy-, and geologic construction materials-related geologic data that will focus attention on the most promising Alaska lands having the potential to sustain or diversify Alaska's economy, or on those lands having a critical impact on Alaska citizens.

### **Performance Measures**

Project tasks and products are financed in part and contingent upon Program Receipts:

1. Publish final surficial and bedrock geology maps of the Upper Chulitna mining district (implemented within the Statewide Mineral Resource Appraisal Project and Statewide Construction Materials Project).
2. Publish an interim surficial and bedrock geological map of the Petersville–Collinsville mining district (implemented within the Statewide Mineral Resource Appraisal Project and Statewide Construction Materials Project).
3. Publish a series of preliminary maps and reports at the appropriate scale that delineate the surface exposures and project the subsurface extent of possible oil reservoir sands and source rocks in Alaska's undeveloped Western Arctic oil province (implemented within the Statewide Energy Resource Assessment Project).
4. Publish a summary report of structural, stratigraphic, paleontologic, petrographic, and geochemical data pertinent to evaluating the oil potential of possible source- and reservoir-rocks in the undeveloped Western Arctic oil province (implemented within the Statewide Energy Resource Assessment Project).
5. Publish an updated and expanded surficial geology map for the greater Anchorage area (implemented within the Statewide Engineering Geology Project).
6. Publish a volcanic hazards map of Shishaldin Volcano, Alaska (implemented within the Statewide Engineering Geology Project).
7. Publish 1:63,360-scale surficial geology and terrain-unit analysis maps summarizing the location of construction materials (sand, gravel, and rip-rap) in the Upper Chulitna mining district (implemented within the Construction Materials Resources Project).

**DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS**  
**FY98 Budget**

**GENERAL FUND**

<b>SECTION</b>	<b>PROJECT</b>	<b>FY98</b>	<b>TOTALS</b>
<b>Minerals and Energy Resources</b>			
	Statewide Mineral Resource Appraisal	\$615.9	
	Statewide Energy Resource Assessment	468.3	
	Geologic Materials Center	76.3	
	Priority Mineral and Energy Resource Development	49.8	
			<b>\$1,210.3</b>
<b>Engineering Geology</b>			
	Statewide Engineering Geology	240.4	
	Construction Materials Resources	136.1	
			<b>376.5</b>
	<b>Geologic Communications</b>	182.3	<b>182.3</b>
	<b>Director's Office</b>	0.0	<b>0.0</b>
	<b>Technical Support Services</b>	200.8	<b><u>200.8</u></b>
<b>TOTAL GENERAL FUND</b>			<b>\$1,969.9</b>

**CAPITAL IMPROVEMENT PROJECTS**

Geophysical/Geological Mineral Inventory	<b>650.0</b>
Geophysical/Geological Mineral Inventory - Holitna area	<b>150.0</b>
Coalbed Methane	<b>400.0</b>

**DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS**  
**Summary of Budget History**

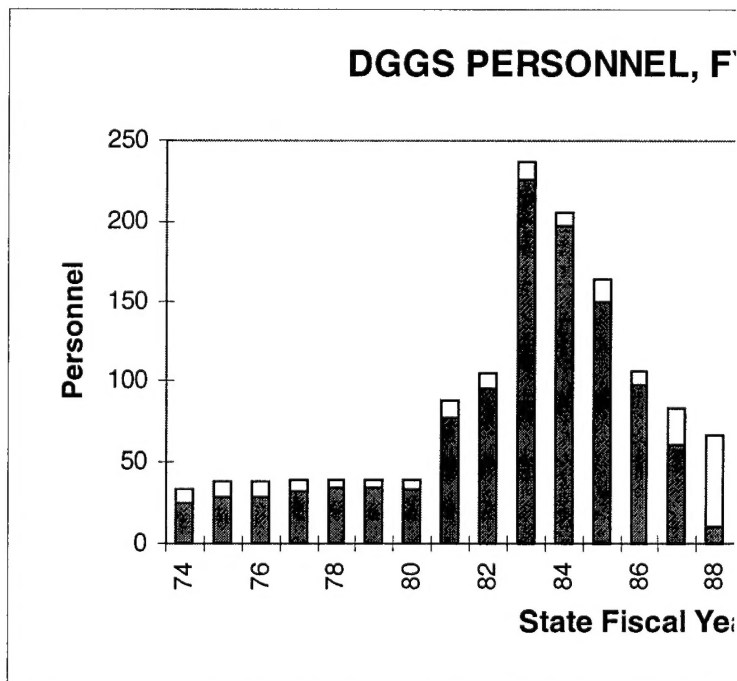
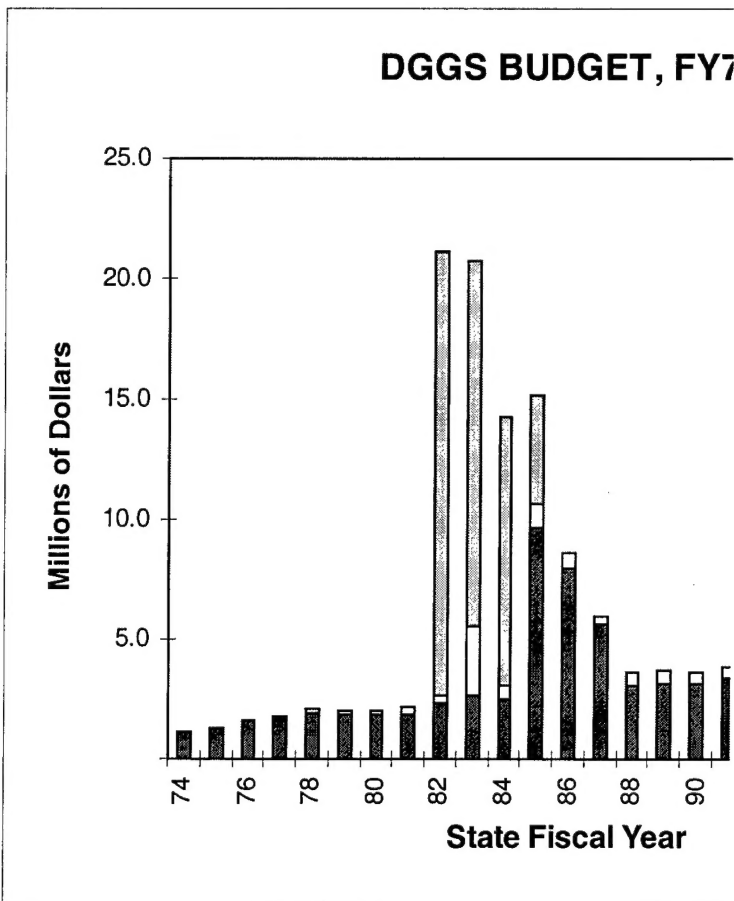
**FY85-FY98**

General Fund

<b>DGGS ALLOCATIONS</b>	<b>FY85</b>	<b>FY86</b>	<b>FY87</b>	<b>FY88</b>	<b>FY89</b>	<b>FY90</b>	<b>FY91</b>	<b>FY92</b>	<b>FY93</b>	<b>FY94</b>	<b>FY95</b>	<b>FY96</b>	<b>FY97</b>	<b>FY98</b>
Mineral Resource Appraisal	2039.9	1687.6	1022.0	808.2	808.2	715.3	853.0	768.7	614.5	685.3	633.3	720.4	671.1	665.7
Energy Resource Appraisal	0.0	0.0	0.0	421.0	421.0	599.6	535.8	507.8	531.9	549.0	551.9	541.4	555.6	544.6
Resource Information/Engineering Geology	1940.3	1158.0	878.6	775.5	775.5	678.3	665.7	698.3	728.3	710.3	569.2	479.8	574.1	558.8
Water Resources	1254.6	1120.5	815.2	599.7	599.7	611.1	763.2							
Administrative Services	1532.2	1201.6	766.9	466.2	575.7	543.1	535.7	514.2	458.1	358.2	284.4	219.5	206.3	200.8
<b>TOTAL</b>	<b>6767.0</b>	<b>5167.7</b>	<b>3482.7</b>	<b>3070.6</b>	<b>3180.1</b>	<b>3147.4</b>	<b>3353.4</b>	<b>2489.0</b>	<b>2332.8</b>	<b>2302.8</b>	<b>2038.8</b>	<b>1961.1</b>	<b>2007.1</b>	<b>1969.9</b>

**TRANSFERRED PROJECTS AND APPROPRIATIONS**

Water Resources (to Water)														739.4
Cadastral Survey (to Land & Water)	644.3	574.1	337.7											
Archaeological Survey (to Parks)	188.2	205.8	212.5											
Energy Resources (to Oil & Gas)	1708.1	1790.8	1444.5											
Seismic Engineering (to Oil & Gas)	408.6	258.5	131.5											
<b>TOTAL</b>	<b>9716.2</b>	<b>7996.9</b>	<b>5608.9</b>	<b>3070.6</b>	<b>3180.1</b>	<b>3147.4</b>	<b>3353.4</b>	<b>3190.5</b>	<b>2332.8</b>	<b>2302.8</b>	<b>2038.8</b>	<b>1961.1</b>	<b>2007.1</b>	<b>1969.9</b>





## INTERNET DOCUMENT INFORMATION FORM

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